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ABSTRACT

Focusing on the future of the Eastern Iowa Community College District (EICCD), this environmental scan examines changes occurring in both local and worldwide populations and workforces; political, societal, and economic environs; and technology. Section I describes the changing population and demographics in the United States, focusing on the declining birthrate; childbearing among women in their 30's; increasing numbers of minorities, immigrants, and female-headed households; and population trends and projections for the state of Iowa. Section II describes the changing workforce/workplace. Included in this section are statistics on emerging jobs and the skills needed to perform them; worker shortages projected for various fields; and Iowa's employment growth. Political, societal, and ecological changes are explored in section III, which discusses families, teenage pregnancies, working women, high school enrollment and completion, minority participation in higher education, and America's environmental problems. Section IV deals with changing technologies and the information explosion, including information on satellite technology, new products of research and development, leading-edge technologies, emerging technologies adapted to the changing demographics, and telecommunications. The final section discusses the world economy in terms of world trade, the decrease in the United States share of the world economy, changes in Europe, and leaders in the world market. In addition, the status of economic development in Iowa is discussed, along with the state's economic outlook and plan for the future. A 114-item bibliography is appended. (JMC)

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AN ENVIRONMENTAL SCAN

PREPARED BY
EASTERN IOWA COMMUNITY COLLEGE DISTRICT
DISTRICT OFFICE OF ACADEMIC AFFAIRS AND PLANNING
SEPTEMBER 1989

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John T. Blong, Chancellor

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INTRODUCTION

We live in a complex world, in which change is a constant. Social, technological, and political turbulence have greatly accelerated in recent years, and the ability of organizations to cope with these changes is being challenged. Dr. Richard Alfred, of the University of Michigan, applies these changes to the future of community colleges, and predicts that a combination of factors will coalesce to reshape institutional mission, programs, academic policies, and the context for governance.

Community college educators must become initiators in shaping their future and the future of their institutions; strategies must be developed to ensure that our educational institutions will be responsive to the needs of the people in the year 2000 and beyond. To do so, requires an examination of our external environment and what is known about the future.

How do we know what the future may look like? In the area of demographics, one can predict with a high degree of certainty what the college-age population will look like because all college-age students in the year 2000 have already been born. An area that is a bit more "iffy" is projecting economic development in third world countries. Their progress, or lack of, is highly contingent upon such factors as political stability, weather, famine, and ideologies. Despite reservations one may have in accepting specific trends and predictions, no one can deny the tremendous amount of change which has occurred in the past 20 years, and the fact that our external environment will continue to change. These changes will impact our community colleges. This document summarizes major changes occurring in our external environment in 5 broad areas:

1. The Changing Population and Demographics
2. The Changing Workforce/Workplace
3. Political, Societal, and Ecological Changes
4. The Changing Technologies and the Information Explosion
5. The World Economy

Where appropriate, information in each of the above five areas are summarized on a local, regional, national, and international basis.

Our current environment, as well as projections for the future are briefly described to stimulate discussions regarding their implications on the future of the community college. With these trends in mind, a "vision" of the future community college will be developed. With this "vision", the EICCD will develop its strategic plan for moving into the Twenty-first Century.

I.
THE CHANGING POPULATION AND DEMOGRAPHICS

DECLINING BIRTHRATE

- The Baby Boom describes the increased birth rate following World War II, 1946-1964. It was followed by a slump in births that lasted from 1964 to 1978. The 1980's has seen a slight increase in the birth rate, largely due to women in the Baby Boom generation having children in their thirties. This phenomenon is known as the Baby Boomlet. Beginning in 1986, national birth rates entered a decline.

- The "Boomlet" (1980-85) represents a 9% increase in births. The rate of this increase varied by region:

Midwest	2%
Northeast	5%
South	16%
West	21%

The regions with the most minorities gained the most in births. 73% of the births occurred in 5 states: California, Florida, Texas, Arizona, and North Carolina. (1)

- Between 1980 and 1987, the number of newborns in Iowa dropped 21%. Iowa's 37,470 births in 1987 were the least in 75 years. (2)

- The overall U.S. population, which increased by 1% annually between 1972 and 1986, is projected to grow by 0.8% annually to 2000. (3)

- The decline has been greater in the Frostbelt States, while the Sunbelt States have experienced major increases. (4)

1988 BIRTHRATE

- Births hit 3.9 million -- the most since 1964.

- Women over 30 accounted for 1/3 of the births.

- 22% were to unwed mothers -- most to teens and women under 25 -- up from 19.2% in 1987.

- Birth rates were highest in the South and West.

- Birth rates and family size decline as education and income rise.

- Of the women who gave birth in 1988, between the ages of 18-44, 50.9% are working. (5)

DIFFERENTIAL FERTILITY

- Differential fertility means that not all families have the same number of births.

- The decline in the birth rate has been almost completely a Caucasian and middle class phenomenon. At the same time, there has and will continue to be a proportionate increase in minority births and children raised by single-parent families. (6)

- During the 1990's, large numbers of white women will be moving out of their child-bearing years, producing a sharper decline in the white birth rate.

- The age of the average Hispanic female is almost 10 years younger than her white counterpart. Given the Hispanic fertility rate and the current large numbers of young Hispanic females, there will be an Hispanic baby boom through 2010. (7)

- More than a third of the population growth in the late 1990's is projected to be Hispanic. (8)

- Today, the number of Hispanics, Native Americans, Blacks, Asians, Mormons, and Seventh Day Adventists are all increasing rapidly. (9)

- Over 40% of all births between 1980-85 in the states of California, Texas, Florida, and Arizona, were minority.

- Most large states have a large percentage of minority student enrolled in public schools in the Fall 1980:

Texas	46%
California	43%
Florida	33%
New York	32%
Maryland	32%
New Jersey	28%

The percentages are higher in elementary schools than in secondary schools. (10)

By the year 2000, Caucasians will no longer be the predominant ethnic group in the United States. If the U. S. is to continue to prosper in the next century, it must acknowledge the wide ethnic and cultural diversity of both this country's population and the world and draw more heavily from the skills and knowledge of that populace. -- **Joel Kotkin, author of *The Third Century*.**

- By about 2010, one out of three Americans will be Black, Hispanic, or Asian-American. (11)

- Of the children born in 1982, 33% are non-white, 14% were born out of wedlock, and 24% are currently living below the poverty level.

Figure 1

Projections of the 0–17 Population by Race/Ethnicity
U.S. Total, 1982–2020

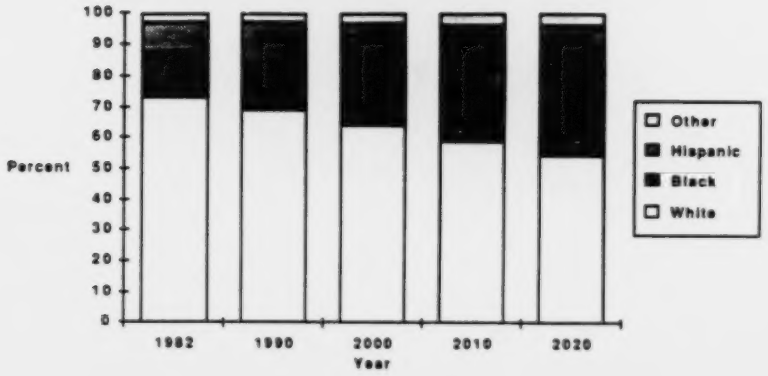

Figure taken from: Pallas, Aaron M., Gary Natkiello, and Edward L. McDill, "The Changing Nature of the Disadvantaged Population: Current Dimensions and Future Trends," Educational Researcher, June/July, 1989, p. 19.
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The greatest asset of any nation is its human resources. We are now facing a human resource crisis in America, and it will be people, not machines, that will spell the difference between success and failure. -- **Jim Duffy, President of Communications for CAP Cities/ABC.**

CHILDBEARING AMONG U.S. WOMEN IN THEIR 30'S

- Between 1970 and 1986, the number of first births to women aged 30 to 34 increased from 42,404 to 181,504. For women aged 35 to 39, the total rose from 11,704 to 44,427 first births. (12)

- In 1988, the rate of birth for women 30-34 was 81.6 per 1000, up from 56.4 in 1976. For women 35-39, the rate was 33.8 versus 22.6 in 1976. The 1988 overall U.S. rate of births is 70 per 1000 women. (13)

- At the same time, the rates of first births for women in their teens and twenties were declining.

- In the 30 to 34 age group, the proportion of first time mothers with college degrees increased from 40% in 1975 to 48% in 1986.

- Measures of infant health were better among college educated first time mothers aged 30 to 34.

CHILDREN ENTERING KINDERGARTEN IN 1988

If we are going to make it to the Twenty-first Century, there must be a much larger investment in youngsters from birth to five. -- **William Honig, California's Superintendent of Schools.**

- 1/3 are the children of teenage mothers.
- 15% speak a language other than English.
- 15% are physically or mentally handicapped.
- 1/3 are non-white.
- 18% were born out of wedlock.
- 24% live below the poverty line.
- 54% of them have mothers who work outside the home.
- Many of them will be "latch key" children by the third grade; that is, no one will be home to greet them after school.
- 45% of their parents will be divorced or separated by their 18th birthday.
- 20% of the girls will become pregnant during their teen years. (14)

INCREASING NUMBERS OF MINORITIES, IMMIGRANTS, & FEMALE-HEADED HOUSEHOLDS

Demographics will do more for equal-opportunity employment than all the government has done in the past six years. -- **Francesco Cantarella, Senior Vice President of Abraham and Strauss.**

- The U.S. Census Bureau predicts America will grow by 41 million people to more than 282 million by 2010. Much of the increase will come from immigration. In about 2028, the country is expected to attain zero population growth, where the number of births equals the number of deaths. After that, increases in the nation's population will depend solely on immigration. (15)

- Thirty-five percent of female-headed households are poor. Only 6.7% of married-couple families are poor. In the 100 largest cities of the U.S., female-headed families outnumber married-couple families by 3 to 2. (16)

- By 1990, minorities of all ages will constitute 20-25% of our total population; the percentage among the youth cohorts will be 30%. (17)

- 25% of all public school students are from minority backgrounds, and in some states it's much higher: (18)

	% of Student Population	State Population Ranking
New Mexico	57%	37th
Texas	45%	2nd
California	43%	1st
Florida	35%	3rd
Maryland	33%	22nd
New York	32%	4th

- California, the most populous state in the U.S. now and in the year 2000, has the largest public school enrollment, and by the year 2000, the majority of its school-aged children and of its entire population will be from minority groups. (19)

- From 1960 to 1983, the percentage of Black households headed by women increased from 29 to 45%. The incidence of female-headed households will continue to increase, contributing significantly to rapid increases in the population on welfare, particularly among minorities. (20)

About 1 in 4 of the 28 million U.S. children between the ages of 10 and 17 have futures that may be in jeopardy because of consequences of school dropout, drug use, or early sex . . . . -- **Middle School Task Force of the Carnegie Council on Adolescent Development, 1989.**

- In 1988, 56% of Black babies and 15% of white babies were born to unwed mothers. (21)

- 75% of the Black women who gave birth to their first child in 1985 through 1988 were unmarried, compared to 20% of the white women. This is a marked increase from 1975, when 54% of the Black women and 12% of the white women had their first child out of wedlock. (22)

- Female-headed households are more than four times likely to be poor than are two-parent families. One reason is lack of or an insufficient amount of child support; in 1985, the average annual payment for child support was $2,315. Women's pay averaged less than 70% of men's. Many mothers work part time for substantially less pay. (23)

Figure 2

Projected Number of Children in Poverty
U.S. Total, 1984-2020

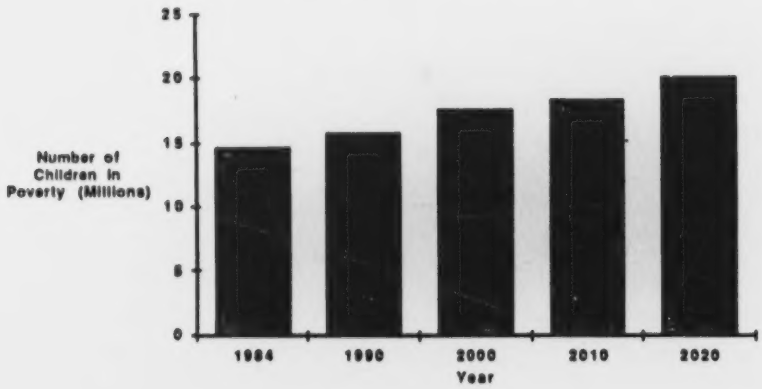
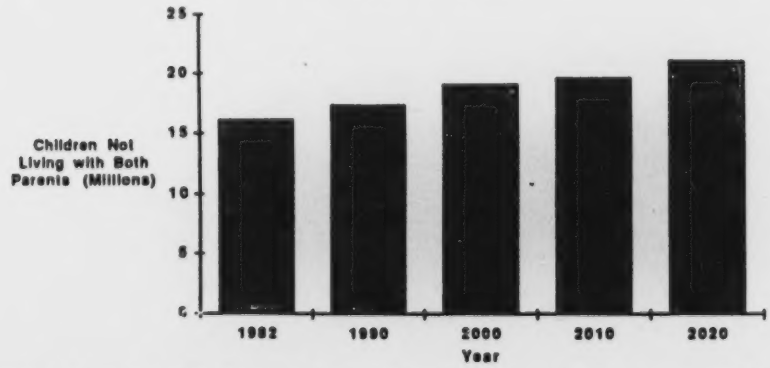


Figure 3

Projected Number of Children Not Living With Both Parents
U.S. Total, 1982-2020



Figures 2 and 3 taken from: Pallas, Aaron M., Gary Natkiello, and Edward L. McDill, "The Changing Nature of the Disadvantaged Population: Current Dimensions and Future Trends," Educational Researcher, June/July 1989, pp. 19-20.
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- Three-quarters of America's Black children spend at least some time in poverty, compared with one-fifth of White children. One-third of the Black children are poor for 7 years or more. (24)

- Two-thirds of all immigrants in the world are those entering the U.S. (25)

- Only 20% of legal immigrants are currently admitted into the U.S. because their skills are in great demand. The usual criteria are family ties or refugee status. (26)

- One-third of Asian immigrants to the U.S. are college graduates. Their children perform well in school, and in their chosen occupation. (27)

- In 1985, there were 5 million Asian Americans; 33% live in California, 13% Hawaii, 9.4% New York; many live in Illinois, New Jersey, Texas, and Washington. By 2000, their number will surpass 10 million. (28)

- There is currently a "minority majority" in each of the 24 largest city public school systems in the U.S.; by the year 2000 it is projected that there will be minority majorities in the public school systems of 10 states. (29)

Figure 4

Projected Number of Children With a Primary Language Other Than English U.S. Total, 1982-2020

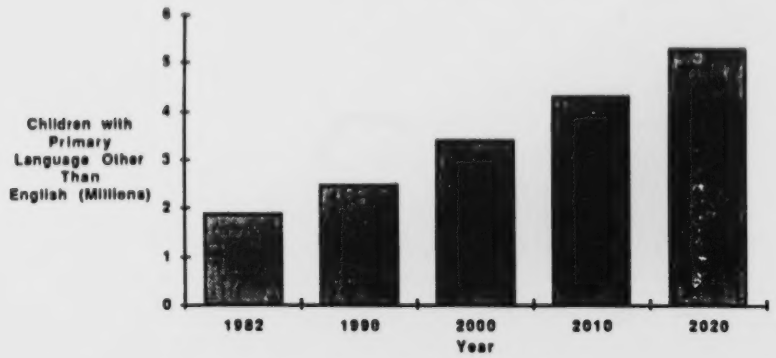

Figure 4 taken from: Pallas, Aaron M., Gary Natkiello, and Edward L. McDill, "The Changing Nature of the Disadvantaged Population: Current Dimensions and Future Trends," Educational Researcher, June/July 1989, p. 21.
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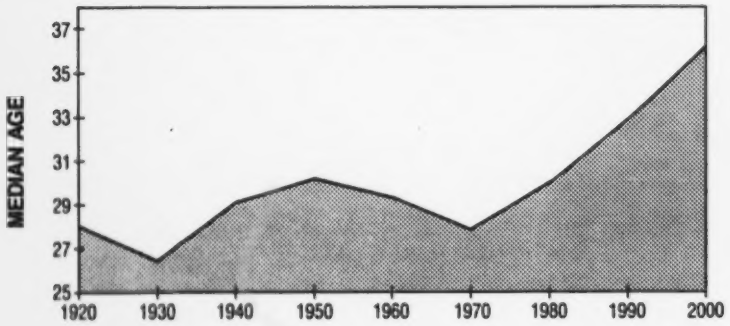
- In 1983, for the first time in U.S. history, there were more people over 65 than there were teenagers. (30)

- The U.S. Census Bureau indicates that five thousand Americans reach age 65 every day. By 1990, more than 32 million Americans will be 65 or older, up from 25.5 million in 1980. By 2030, more than 20% of all Americans will be 65 or older. Americans over 85, whose numbers could approach 7 million by 2012, are the fastest-growing segment of the population.

- By 2000, the median age in the U.S. will be about 36.1 years.

Figure 5

THE U.S. POPULATION IS GROWING OLDER
(Median Age)

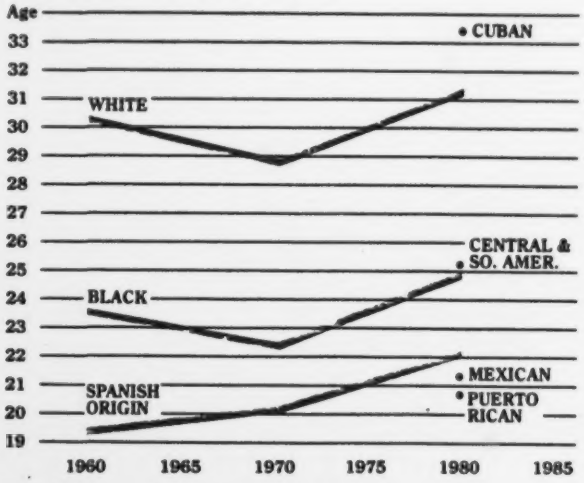


Source: U.S. Bureau of the Census, "Current Population Reports," Series P-23, No. 138, Table 2-9

Taken from: Workforce 2000, p. 80.

The median age of Americans varies by race and ethnic origin. There is over a 10-year difference between Whites and Hispanics.

Median Age of Spanish Origin, Black and White Population Figure 6

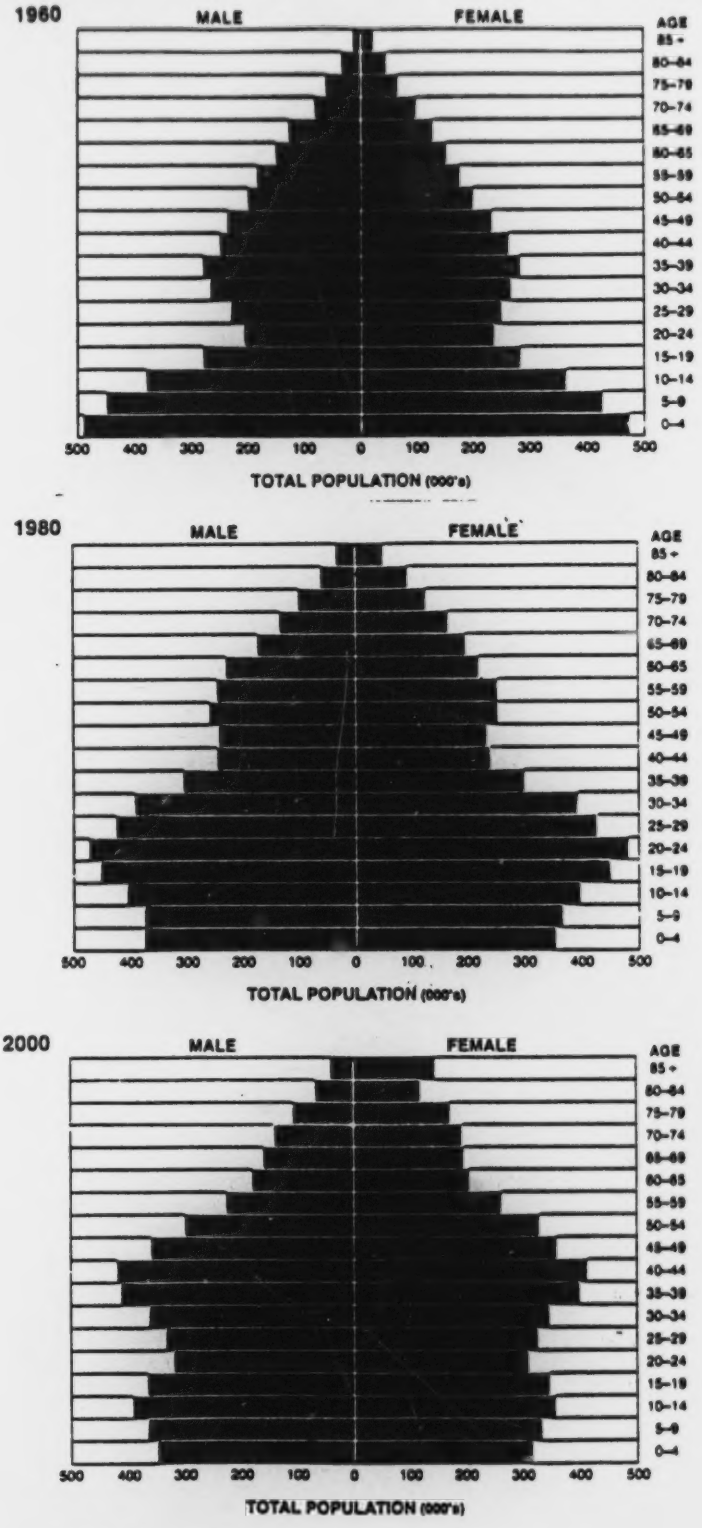


Note: Ages 21 to 29 are considered high fertility ages.
Source: National Association for Hispanic Elderly, Los Angeles, California, December 1982.

Taken from: Higher Education: Diversity is our Middle Name, p. 9.

Figure 7

DISTRIBUTION OF POPULATION BY AGE BRACKET



SOURCE: *American Demographics*, January 1983.

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- The U.S. National Center for Health Statistics predicts that by 2003, life expectancies at birth will be 84 years for women and 74 for men. (31)

- In 1988, only about 15% of men over the age of 65 were in the workforce, down from 25% in 1970. Only 68% of those 55 to 64 still work, compared to 83% 20 years ago. (32)

- When the baby boomers retire (about 2020), rather than 17 workers paying for their Social Security benefits, there will be only 3, and 1 of these 3 will be a non-white worker. (33)

As our population ages, they will buy more.

Figure 8

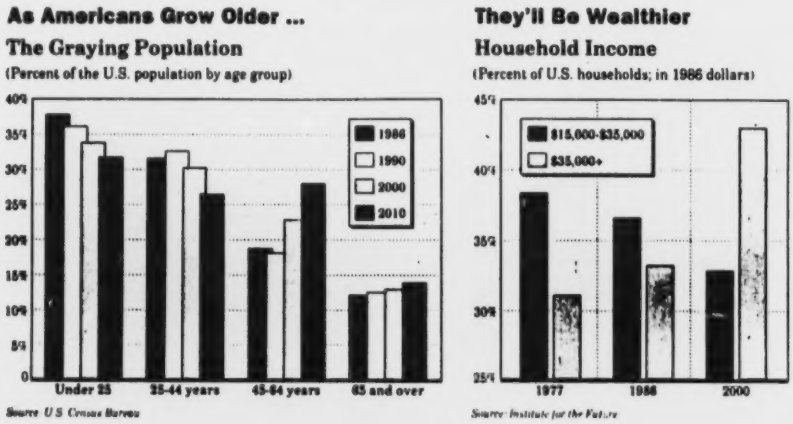


Figure 9

Figures 8 and 9 taken from: King, Thomas R. "Catering to the Maturing Baby-Boom Generation." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A7. Reprinted by permission of The Wall Street Journal, © Dow Jones & Company, Inc., 1989. All Rights Reserved Worldwide.

U.S. FARM POPULATION

- A report issued on September 12, 1989 by the U.S. Census Bureau and the U.S. Department of Agriculture's Economic Research Service indicated that:

  - In 1988, the U.S. farm population was 4.95 million, compared to 4.98 million in 1987. This represents 2% of the U.S. population. In 1980, a total of 6.9 million people lived on farms, representing 2.7% of the overall population.

  - About 65 million people, or 25% of the U.S. population, live in rural areas, but not necessarily on farms. Rural areas include open countryside and towns of less than 2500 people.

  - 44% of the residents of the South live in rural areas, the largest proportion for any region.

  - The distribution of the U.S. farm residence by region is:

	1980	1988
Midwest	45%	50%
South	50%	30%
West	11.8%	14.6%
Northeast	7.3%	5.2%

  - The U.S. farm population is older than other residential components of the population. The median age of farm residents in 1988 was 38 years, compared to 32 years for the non-farm population.

  - In 1988, there were 109 males per 100 females living on farms. In the non-farm population, there were approximately 94 males per 100 females.

  - A higher proportion of farm residents are married: about 69% of farm residents 15 years or older were married and living with a spouse in 1988, compared with 56% of non-farm residents. (34)

Table 1

Iowa's 1989 Population & Demographics

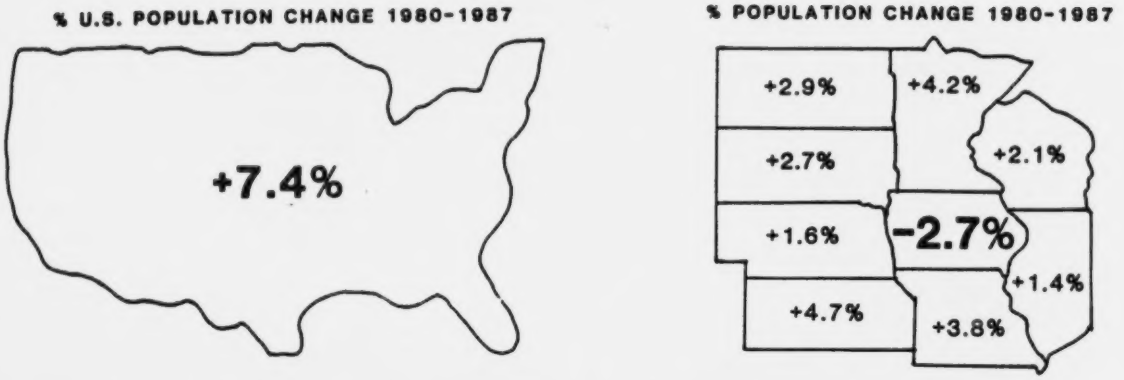
Population: 2,780,000 (Rank:29)

Age distribution:	
Up to 17	25.2%
18 to 24	10.6%
25 to 34	17.5%
35 and older	46.7%
Racial and ethnic distribution:	
American Indian	0.2%
Asian	0.5%
Black	1.4%
White	97.5%
Other and unknown	0.4%
Hispanic (may be any race)	0.9%
Educational attainment of adults:	
At least 4 years of high school	71.5%
At least 1 to 3 years of college	28.6%
At least 4 years of college	13.9%
Per-capita personal income:	$14,662
New high-school graduates in:	
1989-90 (estimate)	34,185
1999-2000 (estimate)	32,514
High-school dropout rate:	13.6%

Taken from: The Chronicle of Higher Education Almanac, September 6, 1989. (35)

While the U.S. population increased 7.4% from 1980 to 1987, Iowa's dropped 2.7%. (36)

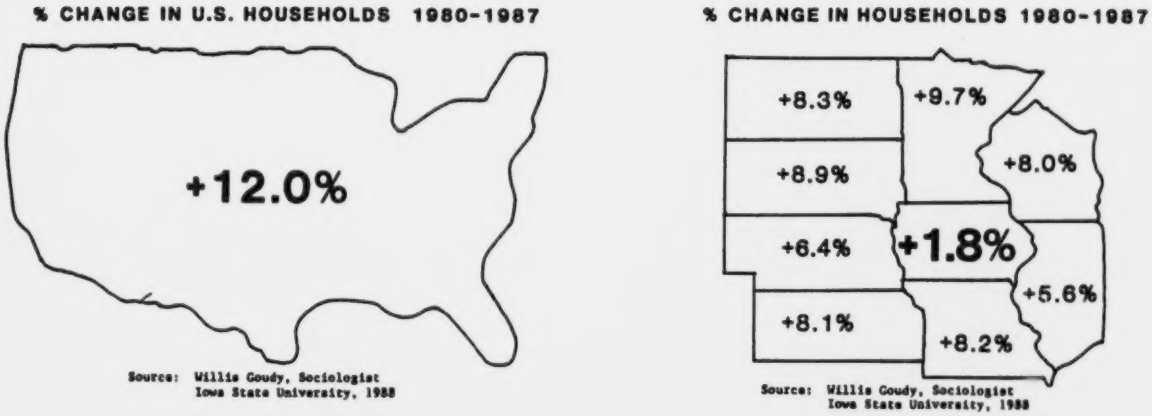
Figure 10



Source: Willis Goudy, Iowa State University, 1988.

The number of U.S. households increased 12% from 1980-87; Iowa experienced a 1.8% increase in the number of households. (37)

Figure 11



The number of newborns in Iowa dropped 21% between 1980 and 1987, a period when births nationally were rising. Iowa's births in 1987 were the least in 75 years(38); births in Iowa in 1988 totalled 204 more than those in 1987. (39)

Though more babies were born in Iowa in 1988 than in the previous year, the natural population growth (the number of births minus the number of deaths) continued downward. (40)

Figure 12

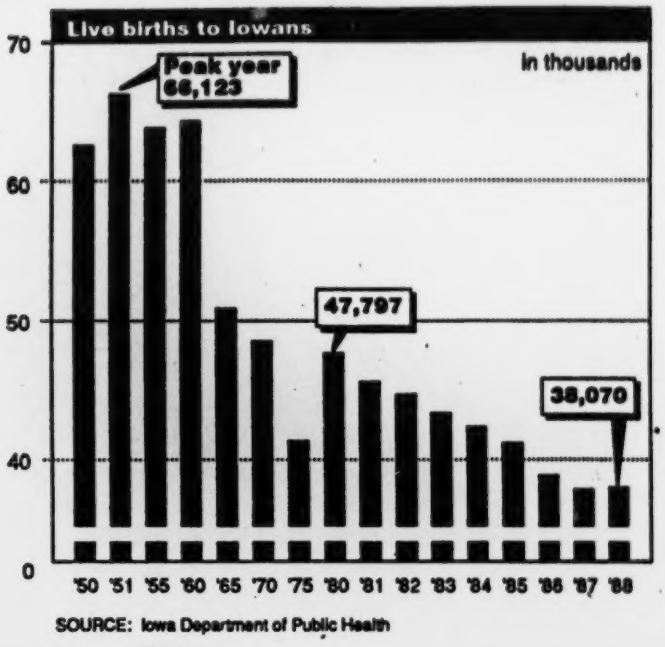


Figure 12 taken from: Des Moines Register, June 22, 1989, p. 3A.
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Figure 13

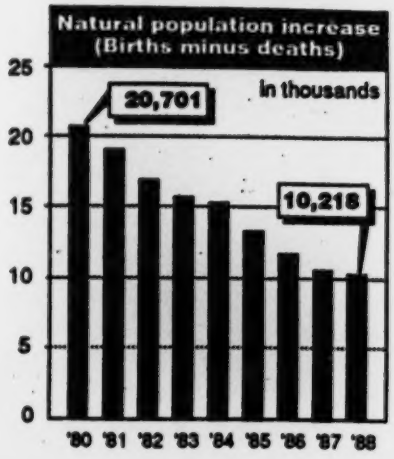

Figure 13 taken from: Des Moines Register, June 22, 1989, p. 3A.
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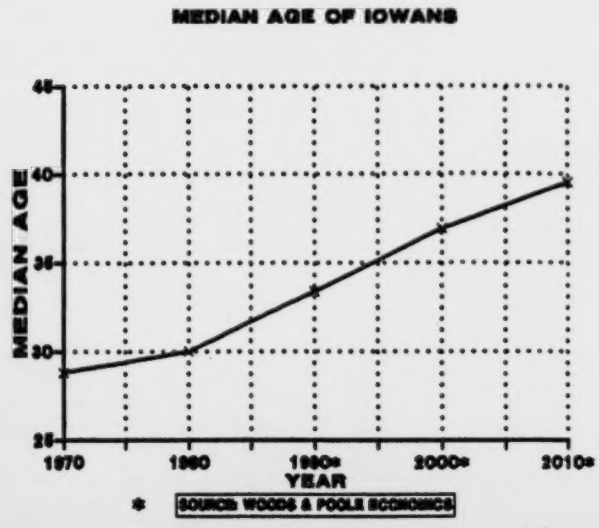
Figure 14



In 1980, the median age of Iowans was 30. The predicted median age of all Iowans in 2000 is 37. (41)

Figure 14 taken from: Labor Market Information for Iowa, Iowa Department of Employment Services, June, 1989, p. 30.

Several organizations have made population projections for Iowa for the year 2000 and beyond. Among the most optimistic is that made by Woods & Poole Economics, Inc. (1987). The most pessimistic is the projection of the United States Census Bureau (1988). Five different projections are depicted in the graph below; the specific projections are shown in the table below.

Figure 15

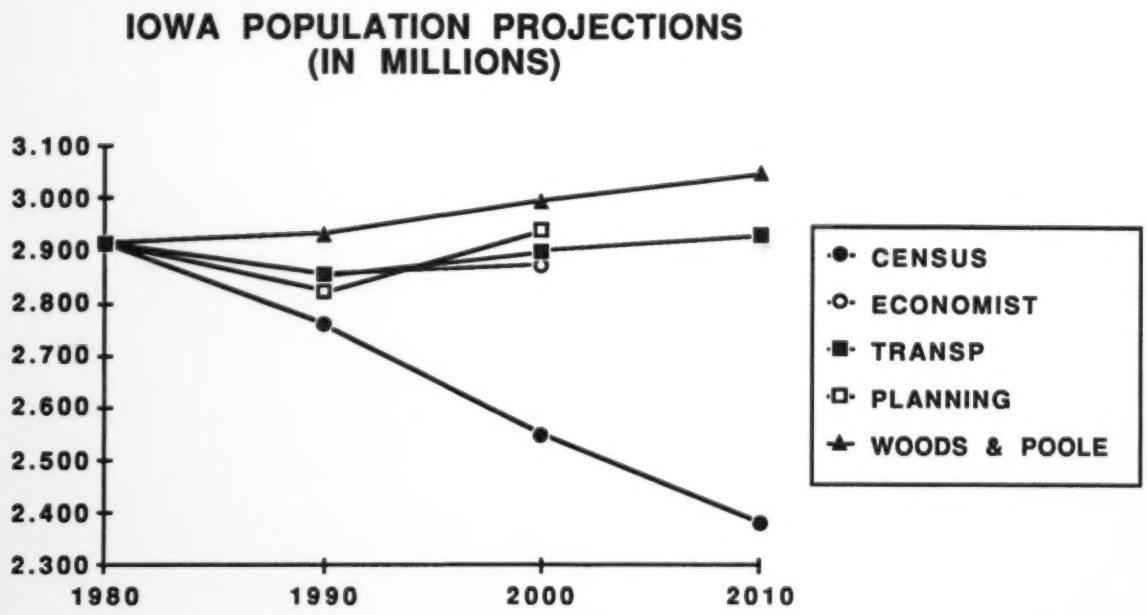


Table 2

IOWA POPULATION PROJECTIONS

	1980	1990	2000	2010
U.S. Bureau of the Census	2,914,000	2,758,000	2,549,000	2,382,000
Iowa State Economist	2,914,000	2,855,000	2,875,000	No Proj
Iowa Department of Transportation	2,914,000	2,853,000	2,900,000	2,930,000
National Planning Association	2,914,000	2,821,000	2,940,000	No Proj
Woods & Poole Economics, Inc.	2,914,000	2,933,000	2,996,000	3,048,000

IOWA AGE DISTRIBUTION: PROJECTIONS

Population projections are based on births and death trends, migration into and out of an area, and employment opportunities. The following projections of Iowa's total population, and for various age categories are derived from three sources:

1. 1980 information from the U.S. Bureau of Census
2. Projections from the Office of the State Demographer for Iowa, based on demographic trends of the early 1980's, and released in 1984.
3. Projections made by Woods & Poole Economics, Inc., which also utilized economic models, and reported in 1987.

The results of these two projections can be summarized as follows:

- The two projections of Iowa's total population differ by about 30,000 residents (1% of the total), with Woods & Poole higher than the Office of the State Demographer. The population of the state will grow by 5,000-6,000 residents a year. Growth will vary across age groups.

- In the year 2000, those under the age of 15 will be fewer in number than in 1980. The change is small; Woods & Poole project a decline of 1.4%, while the State Demographer estimates a 2.4% decline. There will be a 22-24% decrease in the numbers of Iowans 15-34 years old from 1980 to 2000. The Baby Boom generation is the primary cause for this drop. Those born 1946-1964 were 15-34 in 1980.

- The number of Iowans 35-54 will increase by 250,000 or 43% by the year 2000; these are the Baby Boomers getting older.

- The numbers of people 55 years and older will also increase. The State Demographer estimates the increase at about 32,800 residents or 5% from 1980 to 2000. Woods & Poole project an increase of 77,300 or 12%.

- For those 75 and older, Woods & Poole project an increase of about 56%, the State Demographer -- 31%.

- The largest increase from 1980 to 2000 in any single age group is for those 85 and older. Woods & Poole project the number to double from 44,900 in 1980 to 91,600 in 2000, a gain of 104%. (42)

Table 3

POPULATION PROJECTIONS FOR IOWA AND COUNTIES OF EICCD

	Census	State Demographer			Woods and Poole Economics, Inc.			
STATE OF IOWA	1980	1990	1995	2000	1990	1995	2000	2010
Total	2913808	2913500	2931800	2965000	2933190	2961740	2996270	3048660
0-4	221628	229300	214900	205300	239320	228510	213890	214640
5-9	211061	234900	229100	215600	218020	226250	218400	201280
10-14	231700	217200	232300	227300	197310	212310	222510	201480
15-19	277633	196900	208500	225800	202340	194600	211070	211510
20-24	272024	193100	181700	197500	211260	186910	180800	200220
25-29	243200	219600	181800	175300	237170	200070	178100	183370
30-34	205954	234500	215000	180100	235760	224710	190300	164130
35-39	161246	225700	228500	211000	213720	228900	216890	165060
40-44	141451	194500	221100	224800	201910	212640	226620	182410
45-49	135520	154800	190400	217100	158910	192070	207120	210060
50-54	145902	134300	150600	185900	128500	151070	186740	215970
55-59	145854	124500	128300	144800	119750	122180	145270	192920
60-64	133071	126600	116000	120400	125410	113060	117390	169610
65-69	117905	121700	115400	106200	123150	117050	103890	126400
70-74	96949	105700	106700	101800	106840	113180	107490	103350
75-79 (or 75+)	75104	200200	211500	226100	88160	91860	100070	90600
80-84	52686				64290	72750	78120	86240
85 and Over	44040				61170	73640	91580	129260
CEDAR								
Total	18633	18100	18000	18000	18950	19010	19140	19490
0-4	1444	1300	1200	1100	1530	1440	1330	1320
5-9	1339	1400	1300	1200	1410	1450	1390	1270
10-14	1548	1400	1400	1300	1340	1420	1480	1320
15-19	1680	1100	1200	1200	1240	1180	1270	1270
20-24	1381	1000	900	1000	1020	880	830	910
25-29	1416	1200	1000	900	1400	1170	1030	1060
30-34	1312	1300	1300	1000	1480	1390	1170	1000
35-39	1105	1400	1400	1300	1410	1500	1400	1050
40-44	958	1300	1400	1400	1420	1440	1510	1200
45-49	857	1100	1300	1400	1060	1270	1360	1370
50-54	984	900	1100	1300	840	990	1220	1410
55-59	930	800	900	1100	790	810	960	1280
60-64	966	900	800	900	890	800	820	1180
65-69	836	800	800	700	840	820	710	860
70-74	641	800	700	700	690	750	700	660
75-79 (or 75+)	532	1400	1500	1500	640	650	720	660
80-84	396				480	530	580	680
85 and Over	310				460	540	670	1000
CLINTON								
Total	57122	56800	57000	57400	53860	52390	51060	49200
0-4	4383	4400	4100	3900	4430	4070	3660	3480
5-9	4319	4600	4500	4200	4130	4120	3820	3330
10-14	4965	4300	4500	4400	3840	3990	4000	3420
15-19	5394	3700	3900	4200	3700	3440	3590	3450
20-24	4616	3500	3200	3500	3310	2810	2620	2790
25-29	4446	4100	3400	3200	4170	3380	2900	2870
30-34	4089	4400	4200	3600	4380	3970	3240	2660
35-39	3270	4400	4300	4100	4050	4140	3790	2750
40-44	2939	4000	4300	4300	3830	3890	3990	3050
45-49	2688	3200	3900	4200	2940	3470	3600	3490
50-54	2966	2800	3100	3800	2440	2770	3280	3620
55-59	2984	2500	2600	2900	2300	2270	2570	3250
60-64	2682	2500	2300	2500	2380	2090	2080	2860
65-69	2346	2500	2300	2100	2280	2090	1790	2070
70-74	1830	2100	2200	2000	1900	1930	1780	1600
75-79 (or 75+)	1398	3900	4200	4500	1580	1560	1630	1370
80-84	982				1170	1250	1290	1310
85 and Over	805				1030	1180	1410	1820

Source: Population Projections for Selected Age Groups in Iowa Counties: 1990-2010, Ames, IA: Iowa State University, Cooperative Extension Service, CRD 275, (Census Services: Willis Goudy and Renea Miller).

	Census	State Demographer			Woods and Poole Economics, Inc.			
	1980	1990	1995	2000	1990	1995	2000	2010
JACKSON								
Total	22503	22300	22500	22900	22310	22220	22290	22420
0-4	1827	1900	1700	1700	1920	1780	1620	1540
5-9	1789	2000	1900	1800	1810	1830	1720	1510
10-14	2157	1800	2000	1900	1720	1790	1830	1570
15-19	2335	1500	1600	1700	1610	1500	1610	1580
20-24	1722	1400	1200	1300	1290	1100	1060	1160
25-29	1573	1500	1300	1100	1480	1220	1070	1090
30-34	1383	1600	1600	1300	1630	1480	1260	1060
35-39	1254	1600	1600	1600	1590	1650	1530	1121
40-44	1055	1400	1600	1600	1500	1540	1610	1250
45-49	1124	1200	1400	1600	1230	1470	1540	1500
50-54	1099	1000	1200	1400	930	1080	1320	1520
55-59	1094	1100	1000	1200	940	940	1100	1470
60-64	983	1000	1000	1000	1000	860	890	1280
65-69	962	1000	1000	1000	1060	990	890	1090
70-74	775	800	900	900	890	990	980	1020
75-79 (or 75+)	569	1600	1700	1800	710	780	870	850
80-84	437				530	610	650	720
85 and Over	365				490	610	750	1080
LOUISA								
Total	12055	12600	13000	13300	12470	12670	12900	13420
0-4	976	1000	1000	1000	1070	1020	960	990
5-9	968	1000	1000	1000	1000	1040	1010	950
10-14	1047	1000	1000	1100	890	960	1010	930
15-19	1116	900	900	900	840	810	890	930
20-24	918	800	800	800	740	650	640	740
25-29	952	900	800	800	960	810	730	780
30-34	837	900	1000	800	990	960	810	720
35-39	678	1000	900	1000	930	990	950	740
40-44	665	900	1000	900	910	960	1020	840
45-49	565	700	800	1000	890	830	900	930
50-54	590	700	700	800	540	640	790	960
55-59	556	500	600	700	480	500	600	830
60-64	520	500	500	600	520	480	500	750
65-69	532	500	500	500	560	520	470	590
70-74	412	400	400	400	470	500	480	470
75-79 (or 75+)	312	800	900	900	370	400	440	410
80-84	232				270	310	350	390
85 and Over	179				240	280	360	520
MUSCATINE								
Total	40436	46400	48900	51000	49120	56980	63550	73700
0-4	3357	4100	4100	4000	4370	4760	4910	5600
5-9	3291	4000	4200	4200	4020	4760	5050	5300
10-14	3507	3600	4000	4200	3540	4370	5040	5220
15-19	3775	3300	3500	3800	3290	3650	4390	5120
20-24	3460	3300	3100	3300	3310	3370	3620	4690
25-29	3329	3800	3400	3300	4030	3910	3860	4610
30-34	3036	4000	4100	3600	4250	4600	4300	4260
35-39	2449	3700	4100	4100	3870	4710	4950	4320
40-44	2089	3100	3700	4000	3420	4170	4940	4620
45-49	1826	2500	3100	3600	2610	3660	4380	5090
50-54	1868	2100	2400	3000	2050	2760	3780	5020
55-59	1850	1700	2000	2300	1880	2210	2900	4430
60-64	1694	1700	1600	1800	1900	1990	2280	3810
65-69	1469	1600	1600	1500	1830	2030	2010	2940
70-74	1213	1400	1400	1400	1550	1920	2050	2220
75-79 (or 75+)	907	2600	2800	3000	1260	1530	1830	1870
80-84	674				990	1250	1490	1840
85 and Over	422				960	1310	1810	2850

Source: Population Projections for Selected Age Groups in Iowa Counties: 1990-2010, Ames, IA: Iowa State University, Cooperative Extension Service, CRD 275, (Census Services: Willis Goudy and Renea Miller).

SCOTT	Census	State Demographer			Woods and Poole Economics, Inc.			
	1980	1990	1995	2000	1990	1995	2000	2010
Total	160022	166600	171000	176000	169870	176960	181720	187750
0-4	13543	14200	13700	13500	15550	15330	14660	15030
5-9	12812	14300	14300	13800	14140	15080	14820	13910
10-14	14096	13100	13800	13800	12320	13770	14650	13470
15-19	14574	11700	12500	13100	11150	11180	12490	12950
20-24	15572	12700	11400	12500	12480	11470	11290	12970
25-29	15509	13400	12800	11900	15990	13950	12630	13400
30-34	13566	14600	13400	13000	16290	15960	13690	12940
35-39	10063	14700	14400	13300	14010	15400	14970	11690
40-44	8227	13000	14400	14100	12190	13380	14720	12290
45-49	7381	9700	12600	14000	8940	11370	12700	13430
50-54	7343	7700	9500	12200	7030	8570	10890	13160
55-59	7260	6300	7100	8700	6350	6720	8160	11290
60-64	5825	5400	5600	6200	5960	5760	6100	9290
65-69	4678	4900	4700	4700	5170	5250	4820	6180
70-74	3791	3800	4000	3900	4320	4710	4630	4670
75-79 (or 75+)	2654	6600	6900	7400	3530	3730	4160	3910
80-84	1827				2450	2850	3110	3480
85 and Over	1391				2010	2490	3230	4590

Source: Population Projections for Selected Age Groups in Iowa Counties: 1990-2010, Ames, IA: Iowa State University, Cooperative Extension Service, CRD 275, (Census Services: Willis Goudy and Renea Miller).

The "Bi-State Region" refers to Henry, Mercer, and Rock Island Counties in Illinois and Muscatine and Scott Counties in Iowa. The "Adopted" population projections given below were formulated and adopted by the Bi-State Metropolitan Planning Commission shortly after the 1980 Census. The revised projections were formulated as a result of population migration due to the economic downturn in the early 1980's. These "Revised" projections were adopted by the Planning Commission in 1986.

Table 4

POPULATION PROJECTIONS FOR THE BI-STATE REGION

Adopted by the Bi-State Metropolitan Planning Commission March 26, 1986

	1970 CENSUS	1980 CENSUS	1990 PROJECTIONS		2000 PROJECTIONS		CHANGE 1980-2000	
			ADOPTED	REVISED	ADOPTED	REVISED	ADOPTED	REVISED
HENRY COUNTY	53,217	57,968	63,100	59,900	65,100	62,100	+12.3%	+7.1%
MERCER COUNTY	17,294	19,268	20,900	20,600	23,100	22,400	+19.8%	+16.3%
MUSCATINE COUNTY	37,181	40,436	43,700	46,400	46,800	51,000	+15.7%	+26.1%
ROCK ISLAND COUNTY	166,734	166,759	173,700	161,000	182,000	166,000	+9.1%	0.0%
SCOTT COUNTY	142,617	160,022	174,000	166,600	187,300	176,000	+17.0%	+10.0%
BI-STATE REGION	417,113	444,471	475,400	454,500	504,300	477,500	+13.5%	+7.3%
ILLINOIS	11,144,873	11,433,998	11,826,000	11,688,000	12,300,000	12,091,000	+7.6%	+5.7%
IOWA	2,824,376	2,913,808	2,902,000	2,914,000	3,005,000	2,985,000	+3.1%	+1.8%

SOURCE: ILLINOIS BUREAU OF THE BUDGET
IOWA OFFICE OF PLANNING & PROGRAMMING

Taken from: Overall Economic Development Program for the Bi-State Region, 1989, p. 23.

ENDNOTES

I. THE CHANGING POPULATION AND DEMOGRAPHICS

1. Harold L. Hodgkinson, "Reform? Higher Education? Don't Be Absurd!", Phi Delta Kappan, December, 1986, pp. 271-274.

2. David Westphal, "Iowa Plight: Birthrate Losing to Death Toll; Exodus Grows," The Des Moines Register, March 6, 1988, pp. 1 & 4.

3. Howard N. Fullerton, Jr., "Projections 2000: The Labor Force Projections 1986 to 2000," Monthly Labor Review, September, 1987, p. 21.

4. Harold L. Hodgkinson, Higher Education: Diversity is Our Middle Name, National Institute of Independent Colleges and Universities, Washington, D.C., 1986, p. 8.

5. William Dunn, "Mini-boom: Births at 25-year High," USA Today, June 22, 1989, p. 1

6. Harold L. Hodgkinson, Guess Who Is Coming to College? Your Students in 1990, A research report from the State-National Information Network for Independent Higher Education, published by the National Institute of Independent Colleges and Universities, 1983, p. 1.

7. Hodgkinson, Higher Education, p. 9.

8. Fullerton, "Projections 2000: The Labor Force," p. 19-29.

9. Hodgkinson, "Guess Who's", p. 1.

10. Ibid., p. 5

11. Hodgkinson, Higher Education, p. 9.

12. Dunn, "Mini-boom," p. 1

13. Ibid.

14. Hodgkinson, "Reform?", p. 271-274.

15. Thomas R. King, "Catering to the Maturing Baby-Boom Generation," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A7.

16. Michael Novak, "Attacking Problems Money Can't Solve," New York Times, March 22, 1987, p. F-2.

17. Patricia K. Melia and Marshall R. Goodman, "Survival by Controlling Demographic Impacts, or It's Better to Know Now Than Regret Later," paper presented at the American Association of University Administrators Annual Meeting, Toronto, Canada, June 29-July 2, 1987, 26 pages, p. 9.

18. Ibid.

19. Ibid.

20. National Alliance for Business, Employment Policies: Looking to the Year 2000, February, 1986, pp. 2-3.

21. "Two Out of Five Firstborn Children Conceived Out of Wedlock," The Des Moines Register, June 22, 1989, p. 6A.

22. Ibid.

23. "For American Business, New World of Workers," Business Week, September 19, 1988, p. 118.

24. "Why the Underclass Can't Get Out From Under," Business Week, September 19, 1988, p. 124.

25. Hodgkinson, Higher Education, p. 10.

26. "For American Business, New World of Workers," Business Week, p. 120.

27. H. L. Hodgkinson, All One System: Demographics of Education, Kindergarten Through Graduate School", (Washington, D.C.: Institute for Educational Leadership, Inc., 1985), p. 10.

28. Ibid, p. 9.

29. Ibid.

30. Hodgkinson, Higher Education, p. 5.

31. "For American Business, New World of Workers," Business Week, p. 120.

32. Ibid, p. 118.

33. Hodgkinson, Higher Education, p. 5.

34. George Anthan, "After a Decade-Long Slide, Farm Population Steadies," The Des Moines Register, September 13, 1989, p. 1.

35. The Chronicle of Higher Education Almanac, September 6, 1989, p. 46.

36. Willis Goudy, Presentation to the Iowa Legislative Higher Education Task Force, Spring, 1989.

37. Ibid.

38. Westphal, "Iowa Plight," pp. 1 & 4.

39. "Baby Rate Bounces Upward," Quad-City Times, June 23, 1989, p. 44.

40. Kenneth Pins, "For First Time in 8 Years, Iowa Shows Rise in Births," The Des Moines Register, June 22, 1989, p. 3A.

41. Labor Market Information for Iowa, Iowa Department of Employment Services, June 1989, p. 14.

42. Willis Goudy, Iowa Census -- Population Projections for Selected Age Groups in Iowa Counties: 1990-2010., Iowa State University, September 1988, pp. 51-52.

II.
THE CHANGING WORKFORCE/ WORKPLACE

SHIFT FROM MANUFACTURING TO SERVICE INDUSTRIES

- The Bureau of Labor Statistics estimates that employment in the services, excluding government, is likely to comprise 66% of all jobs in the year 2000. The fastest growth will be in high-skill occupations such as engineering, medical technology, computer programming, and systems analyst. (1)

Services are often stereotyped as low-productivity, low-wage industries such as fast food and barber shops. The reality is that many of the largest service industries involve relatively high wages and advanced technology. -- Workforce 2000, p. 22.

- Assembly line jobs, which currently employ 13% of American workers, are projected to employ only 5% by the year 2000. (2)

- By the year 2000, an estimated 5 to 15 million manufacturing jobs will be restructured. An equal number of service jobs will probably become obsolete. The U.S. Bureau of Labor Statistics estimates 16 million new jobs will replace lost jobs between 1984 and 1995; however, 9 out of 10 of these new jobs will be in the service sector. (3)

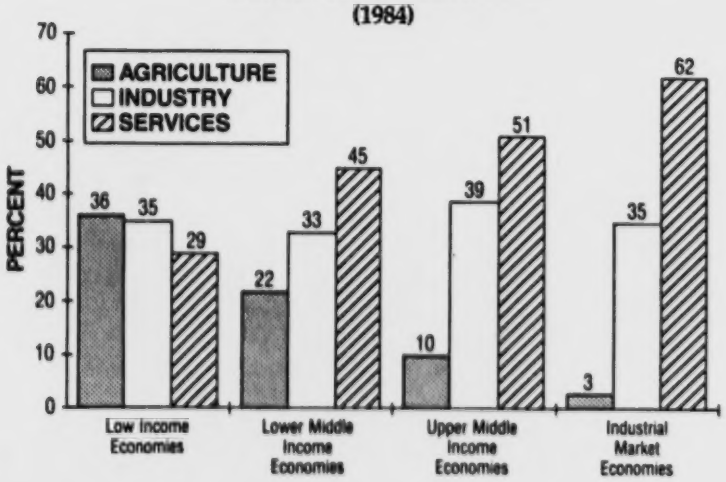
- Private sector service jobs will expand by nearly 16 million to a total of 76 million between now and the year 2000, led by growth in medical care, retail trade, and business services, such as law, consulting, and accounting. That growth alone nearly equals the total present number of jobs in manufacturing. (4)

- It is not so much that the jobs of the future will become high tech, but that technology will alter how they are performed -- changes in the nature of existing jobs or the creation of new jobs will likely require a higher level of skills. (5)

- Services are the largest share of production in advanced countries. (6)

Figure 16

SERVICES ARE THE LARGEST SHARE OF PRODUCTION IN ADVANCED INDUSTRIAL COUNTRIES
(1984)

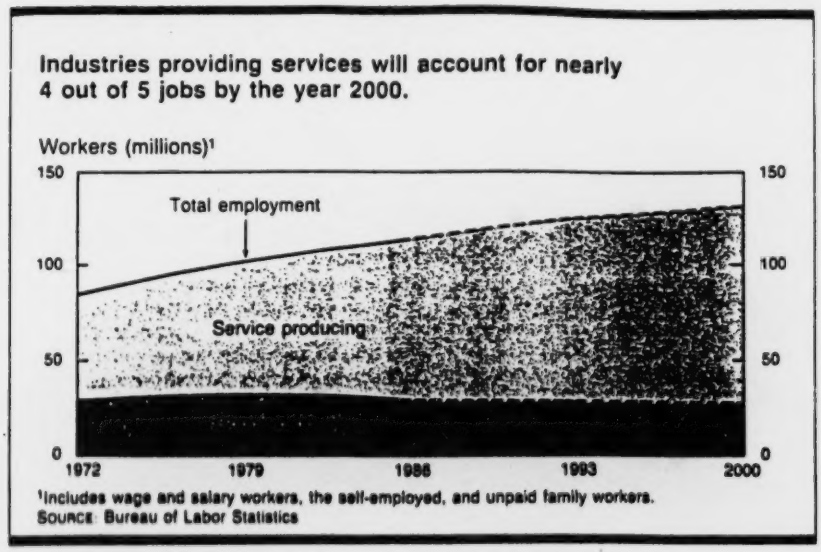


Source: The World Bank, World Development Report, 1986

Taken from: Workforce 2000, p. 21.

- By the year 2000, industries providing services will account for nearly 80% of the jobs.

Figure 17



Taken from: Occupational Outlook Handbook, 1988-89 Edition, p. 10.

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- Between 1986 and the year 2000, the number of service-producing jobs will increase approximately 25%. However, the U.S. workforce will have grown only by 15%. Business will compete for highly skilled workers among fewer qualified prospects. (7)

- The emergence of the service industries has played a large part in the decline of union membership. In 1980, 23% of all employed workers belonged to unions. By 1985, membership had fallen to 18.5%. By 2000, it will be down to approximately 10%.

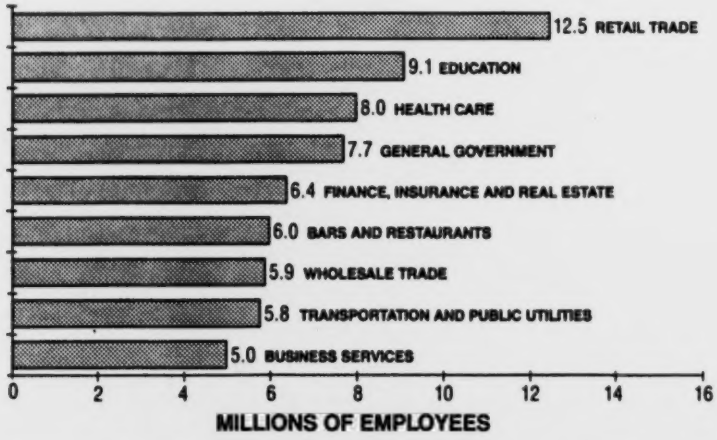
- Many service industries require extensive knowledge and training, and pay premium wages. (8)

Information technology is the fastest growing area of business and industrial activity in the western world. Without question, it will be the engine of economic growth for at least the rest of the century. -- **Wisse Dekker, in the *Harvard Business Review*, May-June 1989. (9)**

- Retail trade is the largest U.S. service industry, followed by education, health care, government, and the finance industries. (10)

Figure 18

THE NINE LARGEST SERVICE INDUSTRIES
(1986)



Source: Derived from U.S. Bureau of Labor Statistics, *Employment and Earnings*, January, 1987

Taken from: Workforce 2000, p. 22.

- The prospects for permanent dislocation of workers are expected to increase. An estimated 1.5 million workers are already permanently displaced, their skills obsolete due to the continuing shift from manufacturing to high technology and service industries and to international competition. (11)

- Ohio is creating 17 new fast-food jobs for every computer programming job. (12)

- About 70% of all new jobs created in Iowa during 1987 and 1988 were in trade, finance, and other service sectors. Only about 10% were in manufacturing.

- Between 1979 (the all-time peak for the Quad-City employment) and 1986, 18,050 manufacturing jobs were lost.

    - o Jobs in non-electrical machinery dropped 47.8%, from 28,000 to 14,600
    - o Primary metal jobs (ALCOA) dropped 25.2%, from 6,250 to 4,675
    - o Fabricated metal jobs dropped approximately 50%, from 2,125 to 1,050 (13)

Between 1979 and 1986, the Quad-City area witnessed significant growth in the following industries:

- o Professional services -- 20.4% increase from 16,050 to 19,325
- o Non-professional services -- a 21.8% increase from 8,925 to 10,875
- o Federal government -- 3.2% increase from 8,500 to 10,475
- o Retail and wholesale trades -- a 4.1% increase from 40,525 to 42,200
- o Financial insurance and real estate -- 10.5% increase from 7,150 to 7,900 (14)

THE RISE OF THE NEW LOWER CLASS WORKER

- During America's economic recovery from 1983-89, 17 million jobs were created; however, over 3 million of these openings are temporary positions.

  Though generally full-time, these temporary workers lack benefits or any sort of job security. Temporary workers are not limited to clerical workers; thousands of designers, engineers, marketing specialists, accountants, and other skilled workers filled their ranks. (15)

- A new job classification known as contingent workers has been created. These include a variety of categories such as part-time, informal, and contract workers.

  These employees are often paid less than full-time, permanent employees for the same work.

  An estimated 36 million Americans, about 25% of all U.S. workers, are contingent employees. (16)

The companies of the future will be predominantly:

- service
- multi-national
- multi-technology
- multi-product
- production-sharing via a global model

Peter Drucker

- The emerging technologies will be the driving forces in the economy of the next several decades, both in terms of new products and modernization of existing companies:
  - Microelectronics, lasers and fiber optics
  - Biotechnology
  - Automation and robotics
  - Advanced computing
  - Superconductivity

Iowa Area Development Group: The Five Year Economic Development Plan, 1989 Update.

Figure 19

At a Glance: Companies for the Future

COMPANY (HEADQUARTERS)	FOUNDED	CHIEF EXECUTIVE	EMPLOYEES	MAIN BUSINESS
Acer Group (Taipei, Taiwan)	1976	Stan Shih	5,000	Personal computers
American Superconductor (Cambridge, Mass.)	1987	George McKinney	19	Superconductors
AT&T (New York)	1885	Robert E. Allen	304,500	Telecommunications
Banc One (Columbus, Ohio)	1929	John B. McCoy	16,870	Banking
Ben & Jerry's Homemade (Waterbury, Vt.)	1978	Fred Lager	325	Ice cream
Biosphertes (Beltsville, Md.)	1987	Gilbert Levin	480	Health and environment technologies
Bumae International Furniture (Inchon, South Korea)	1966	Woo Sang-sik	3,400	Furniture
BSW Architects (Tulsa, Okla.)	1963	Robert P. Sober David E. Broach Robert C. Workman	100	Architecture
Citicorp (New York)	1812	John S. Reed	90,000	Financial services
Coca-Cola (Atlanta)	1886	Roberto Goizueta	17,000	Soft drinks
Codman Research Group (Lyme, N.H.)	1964	Philip Caper	12	Health-data analysis
Compression Labs (San Jose, Calif.)	1976	John E. Tyson	180	Picture telephones
Corning (Corning, N.Y.)	1851	James R. Houghton	26,300	Glass and ceramics
CS Holding (Zurich, Switzerland)	1856	Rainer E. Gut	15,065	Banking
Daimler-Benz (Stuttgart, West Germany)	1886	Edzard Reuter	326,288	Autos and aerospace
DNA Plant Technology (Cinnaminson, N.J.)	1981	Richard Lester	200	Agricultural biotech
Echelon (Los Gatos, Calif.)	1988	M. Kenneth Oshman	45	Automated systems
Elders IXL (Melbourne, Australia)	1839	John Elliott	27,000	Brewing, agribusiness
Electricite de France (Paris)	1946	Jean Bergougnoux	123,000	Electric utility
Equifax (Atlanta)	1899	J.V. White	11,000	Information services
Gruppo Ferruzzi (Milan, Italy)	1948	Raul Gardini	75,000	Agribusiness, chemicals
Fujitsu (Tokyo)	1935	Takuma Yamamoto	50,868	Computers, electronics
General Motors (Detroit)	1908	Roger B. Smith	765,700	Autos, defense
Genetics Institute (Cambridge, Mass.)	1980	Gabriel Schmergel	500	Biotechnology
Granada (Houston)	1971	James Eiler	2,600	Beef production
GTE (Stamford, Conn.)	1918	James L. Johnson	189,000	Telecommunications
Honda Motor (Tokyo)	1948	Tadashi Kume	60,000	Autos, motorcycles
HSST Corp. (Tokyo)	1985	Akira Hayashi	49	Magnetically-levitated trains
Hyatt (Chicago)	1957	Thomas Pritzker	45,000	Hotels
Imperial Chemical Industries (London)	1926	Denys Henderson	130,400	Chemicals
Institut Pasteur (Paris)	1887	Maxime Schwartz	1,800	Biological research
Intel (Santa Clara, Calif.)	1968	Andrew S. Grove	30,800	Semiconductors
IBM (Armonk, N.Y.)	1911	John Akers	387,000	Computers
Interpublic Group (New York)	1930	Philip H. Geier Jr.	14,000	Advertising
Johnson & Johnson (New Brunswick, N.J.)	1886	Ralph S. Larsen	81,300	Health-care products
Judicate (Philadelphia)	1983	Jay D. Seid	26	Private court system
Kurzweil Applied Intelligence (Waltham, Mass.)	1982	Raymond Kurzweil	89	Speech-recognition devices
Metrow Cellular (Kirkland, Wash.)	1983	Craig O. McCaw	2,700	Cellular phones
Merck (Rahway, N.J.)	1891	P. Roy Vagelos	32,000	Pharmaceuticals
MIPS Computer Systems (Sunnyvale, Calif.)	1984	Robert C. Miller	370	Computer products
Motorola (Schaumburg, Ill.)	1928	George Fisher	102,000	Electronics
Mrs. Gooch's Natural Foods (Sherman Oaks, Calif.)	1977	John Moorman	670	Food retailer
NCNB (Charlotte, N.C.)	1874	Hugh L. McColl Jr.	28,000	Banking
Nestor (Providence, R.I.)	1975	Michael G. Buffa	31	Neural-network computers
News Corp. (Sydney, Australia)	1923	Rupert Murdoch	33,000	Media, entertainment
Next (Palo Alto, Calif.)	1985	Steven P. Jobs	250	Computers
Nippon Life Insurance (Tokyo)	1889	Gentaro Kawase	91,700	Life insurance
Northfield Laboratories (Evanston, Ill.)	1985	Richard DeWoskin	23	Medical research
Northrop (Los Angeles)	1939	Thomas V. Jones	44,000	Defense contracting
Nucor (Charlotte, N.C.)	1955	F. Kenneth Iverson	5,100	Steel
Procter & Gamble (Cincinnati)	1837	John G. Smale	77,000	Consumer products
Prodigy Services (White Plains, N.Y.)	1984	Ted Papoe	1,100	Interactive computing
ServiceMaster (Downers Grove, Ill.)	1947	C. William Pollard	17,000	Health care, cleaning
Skadden, Arps, Slate, Meagher & Flom (New York)	1948	Peter Mullen	3,370	Law
Sumitomo Electric (Osaka)	1911	Teisuro Kawakami	13,366	Wires, cables
Sun Microsystems (Mountain View, Calif.)	1982	Scott McNealy	10,000	Workstations
Thinking Machines (Cambridge, Mass.)	1983	Sheryl Handler	280	Computers
Tokos Medical (Santa Ana, Calif.)	1984	Robert Byrnes	900	Medical services
Upjohn (Kalamazoo, Mich.)	1886	Theodore Cooper	21,000	Pharmaceuticals
U S West (Denver)	1984	Josh MacAllister	57,500	Telecommunications
VeriFone (Redwood City, Calif.)	1982	Hatim Tyabji	300	Credit card verification
Walt Disney (Burbank, Calif.)	1923	Michael Eisner	30,700	Entertainment
Wasserstein Perella (New York)	1988	Bruce Wasserstein	175	Investment bank
Waste Management (Oak Brook, Ill.)	1968	Dean L. Buntrock	36,000	Waste
Wearne Brothers (Singapore)	1912	Tang I-Fang	n.a.	Manufacturing
Wheelabrator Technologies (Danvers, Mass.)	1987	Paul M. Montrone	9,700	Trash-to-energy plants

Taken from: "A Select Few Poised to Lead Business into the '90s: Both Old-Line and Upstart Firms, Many of Them Excel as Innovators," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A3.
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- During the 1980's, women have been starting businesses at twice the rate of men; 4.6 million women own their own firms now versus 2.5 million in 1980. The largest percentage of these businesses are in the specialized and public relations, marketing, data processing and business services/personnel, finance, and retailing. 63% of these entrepreneurs have had a college education. (17)

- In the Twenty-first Century, the largest number of jobs in America and most of the other developed countries of the world will be provided by owner-managed firms with less than 100 employees. Work in small-entrepreneur firms will be much different from work in large highly structured corporations:

    o The work environment will be more stressful
    o Less attention paid to bureaucratic detail
    o Employees will be under increasing pressure to be innovative and creative (18)

- Jobs that rely on computer-based information will offer greater mobility to workers across industries. (19)

- The unusually high concentration of prime age workers (25-44 years of age) will lead to intense competition for higher level jobs and greater interest in lateral job opportunities to increase job satisfaction. (20)

- The majority of the jobs in the service industries will be in small companies. (21)

- In the year 2000, more jobs will be decentralized, outside of major population centers. Computer terminals will permit instant access and communication from various locations. Certain jobs will be located where labor may be cheaper, rents lower, or labor more dependable. (22)

- There will be fewer natural career ladders. The new technology makes it increasingly feasible to separate "back office" functions (clerical, service workers) from "front office" (technical, sales, professional, management). It will thus become more difficult to work up the ranks through informal on-the-job training. More formalized training may be necessary. (23)

The new jobs created tomorrow will be in small start-up businesses .... Entrepreneurs, those innovators par excellence, have been the midwives of job development, birthing new enterprises at the prodigious rate of 1.3 million per year. -- **Louis S. Richman, *Fortune*, April 11, 1988.**

COMPANIES OF THE FUTURE WILL BE MORE SUPPORTIVE OF THE FAMILY

- Companies of the future will adopt policies to help workers with families. The employer will also benefit, for these employee benefits will help in retaining their staffs, foster greater worker morale and productivity, reduce absenteeism, and provide tax breaks. (24)

1. Dental insurance
2. Health insurance
3. Flexible working hours
4. Cafeteria-style benefits (i.e., choice among different benefits of equal value)
5. Maternity benefits
6. Company-financed educational opportunity
7. Leave without pay, position assured
8. Sick leave for children's illnesses
9. Career counseling
10. Employee assistance programs
11. Adoption benefits
12. Job sharing
13. Flexible worksites
14. Employee workshops on child care
15. Relocation assistance
16. Paternity benefits
17. Monetary support of child-care facilities
18. Family counseling
19. On-site child care

- Eating and drinking places and the offices of health practitioners are the top two industries projected to generate the largest numbers of new jobs: 1986-2000. (25)

Table 5

Industries projected to generate the largest numbers of new wage and salary jobs, 1986–2000

Industry	New jobs (thousands)
Eating and drinking places	2,471
Offices of health practitioners	1,375
New and repair construction	890
Nursing and personal care facilities	852
Personnel supply services	832
State and local government education	784
Machinery and equipment wholesalers	614
Computer and data processing services	613
Grocery stores	598
Hotels and other lodging places	574
Outpatient facilities and health services, n.e.c.	547
State and local general government, n.e.c.	546
Research, management, and consulting services	531
Legal services	522
Credit agencies and investment offices	499
Credit reporting and business services, n.e.c.	497
Hospitals, private	481
Department stores	386
Real estate	353
Services to dwellings and other buildings	341

n.e.c. = not elsewhere classified.

Taken from: Monthly Labor Review, September 1987, p. 36.
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- The demand for health care will increase because of the aging population and continued advances in the medical technologies. (26)

- Low skilled jobs associated with manufacturing will be moving to the suburbs. (27)

Table 6

Occupations with the largest job growth, 1986–2000, moderate alternative

[Numbers in thousands]

Occupation	Employment		Change in employment, 1986-2000		Percent of total job growth, 1986-2000
	1986	Projected, 2000	Number	Percent	
Salespersons, retail	3,579	4,780	1,201	33.5	5.6
Waiters and waitresses	1,702	2,454	752	44.2	3.5
Registered nurses	1,406	2,018	612	43.6	2.9
Janitors and cleaners, including maids and housekeeping cleaners	2,676	3,280	604	22.6	2.8
General managers and top executives	2,383	2,965	582	24.4	2.7
Cashiers	2,165	2,740	575	26.5	2.7
Truck drivers, light and heavy	2,211	2,736	525	23.8	2.5
General office clerks	2,361	2,824	462	19.6	2.2
Food counter, fountain, and related workers	1,500	1,949	449	29.9	2.1
Nursing aides, orderlies, and attendants	1,224	1,658	433	35.4	2.0
Secretaries	3,234	3,658	424	13.1	2.0
Guards	794	1,177	383	48.3	1.8
Accountants and auditors	945	1,322	376	39.8	1.8
Computer programmers	479	813	335	69.9	1.6
Food preparation workers	949	1,273	324	34.2	1.5
Teachers, kindergarten and elementary	1,527	1,826	299	19.6	1.4
Receptionists and information clerks	682	964	282	41.4	1.3
Computer systems analysts, electronic data processing	331	582	251	75.6	1.2
Cooks, restaurant	520	759	240	46.2	1.1
Licensed practical nurses	631	869	238	37.7	1.1
Gardeners and groundskeepers, except farm	767	1,006	239	31.1	1.1
Maintenance repairers, general utility	1,039	1,270	232	22.3	1.1
Stock clerks, sales floor	1,087	1,312	225	20.7	1.0
First-line supervisors and managers	956	1,161	205	21.4	1.0
Dining room and cafeteria attendants and barroom helpers	433	631	197	45.6	.9
Electrical and electronics engineers	401	592	192	47.8	.9
Lawyers	527	718	191	36.3	.9

Taken from: Monthly Labor Review, September, 1987, p. 59.
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Table 7

Fastest growing occupations, 1986–2000, moderate alternative

[Numbers in thousands]

Occupation	Employment		Change in employment, 1986-2000		Percent of total job growth, 1986-2000
	1986	Projected, 2000	Number	Percent	
Paralegal personnel	61	125	64	103.7	.3
Medical assistants	132	251	119	90.4	.6
Physical therapists	61	115	53	87.5	.2
Physical and corrective therapy assistants and aides	36	65	29	81.6	.1
Data processing equipment repairers	69	125	56	80.4	.3
Home health aides	138	249	111	80.1	.5
Podiatrists	13	23	10	77.2	0
Computer systems analysts, electronic data processing	331	582	251	75.6	1.2
Medical records technicians	40	70	30	75.0	.1
Employment interviewers, private or public employment service	75	129	54	71.2	.3
Computer programmers	479	813	335	69.9	1.6
Radiologic technologists and technicians	115	190	75	64.7	.3
Dental hygienists	87	141	54	62.6	.3
Dental assistants	155	244	88	57.0	.4
Physician assistants	26	41	15	56.7	.1
Operations and systems researchers	38	59	21	54.1	.1
Occupational therapists	29	45	15	52.2	.1
Peripheral electronic data processing equipment operators	46	70	24	50.8	.1
Data entry keyers, composing	29	43	15	50.8	.1
Optometrists	37	55	18	49.2	.1

Taken from: Monthly Labor Review, September 1987, p. 58. Reprinted with permission from the publisher.

The fastest growing jobs will be in the professional, technical, and sales fields which require the highest education and skills levels. -- **Hudson Institute:** ***Workforce 2000.***

Table 8

Fastest declining occupations, 1986–2000, moderate alternative

[Numbers in thousands]

Occupation	Employment		Percent decline in employment
	1986	Projected, 2000	
Electrical and electronic assemblers	249	116	-53.7
Electronic semiconductor processors	29	14	-51.1
Railroad conductors and yardmasters	29	17	-40.9
Railroad brake, signal, and switch operators	42	25	-39.9
Gas and petroleum plant and system occupations	31	20	-34.3
Industrial truck and tractor operators	426	283	-33.6
Shoe sewing machine operators and tenders	27	18	-32.1
Station installers and repairers, telephone	58	40	-31.8
Chemical equipment controllers, operators and tenders	73	52	-29.7
Chemical plant and system operators	33	23	-29.6
Stenographers	178	128	-28.2
Farmers	1,182	850	-28.1
Statistical clerks	71	52	-26.4
Textile draw-out and winding machine operators and tenders	219	164	-25.2
Central office and PBX installers and repairers	74	57	-23.1
Farm workers	940	750	-20.3
Coil winders, tapers, and finishers	34	28	-18.5
Central office operators	42	34	-17.9
Directory assistance operators	32	27	-17.7
Compositors, typesetters, and arrangers, precision	30	25	-17.1

Taken from:
Monthly Labor Review,
September 1987, p. 61.
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Table 9

Employment by broad occupational group, 1986 and moderate growth projections 2000

[Numbers in thousands]

Major occupational group	1986	Projected, 2000	Percent change, 1986–2000
Total employment	111,623	133,030	19.2
Technicians and related support workers	3,726	5,151	38.2
Service workers, except private household workers	16,555	21,962	32.7
Salesworkers	12,606	16,334	29.6
Executive, administrative, and managerial workers	10,583	13,616	28.7
Professional workers	13,538	17,192	27.0
Precision production, craft, and repair workers	13,924	15,590	12.0
Administrative support workers, including clerical	19,851	22,109	11.4
Operators, fabricators, and laborers	16,300	16,724	2.6
Private household workers	981	955	-2.7
Farming, forestry, and fishing workers	3,556	3,393	-4.6

NOTE: Estimates of 1986 employment, the base year for the 2000 projections, were derived from data collected in the Occupational Employment Statistics Surveys.

Taken from:
Monthly Labor Review,
September 1987, p. 6.
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The American Society for Training and Development and the U.S. Department of Labor conducted a two-year study to find out what skills employees need. Sixteen basic skills were identified in their report, "Workplace Basics: The Skills That Employers Want:" (28)

1. Learning to learn
2. Reading
3. Writing
4. Computing
5. Listening
6. Speaking
7. Solving problems
8. Thinking creatively
9. Setting goals and staying motivated
10. Cultivating self esteem
11. Fostering interpersonal relations
12. Developing personal and career skills
13. Promoting teamwork
14. Negotiating and building concensus
15. Understanding your organization
16. Leadership

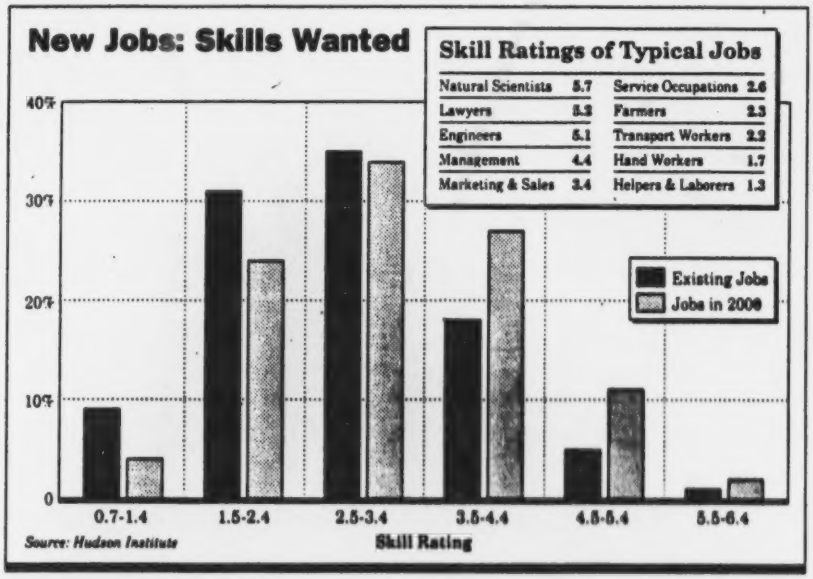
BROAD TECHNICIAN SKILLS

Many occupations in the future will require a broad technician rather than a high technician. The skills needed by a broad technician are: (29)

- Understands the basic principles of technology in an information age saturated with the use of technology.
- Connects practice and theory in the work world.
- Identifies problems and then analyzes, tests, and troubleshoots to find solutions.
- Integrates the interests of complementary work areas.
- Works independently with a network of individuals much of the time, under the general supervision of a highly skilled, frequently more narrowly specialized professional.
- Works willingly and well with his/her hands as well as with the brain.
- Has mastered a basic-skills package that includes a core of competence in math, science, computer science, and communications.
- Is liberally educated to function competently as a citizen, a consumer, a family member, and a neighbor.
- Has developed the proficiencies to be a life-long learner.

- The rising skill requirements of new jobs can be illustrated by ranking jobs according to the needed skills. Based on numerical ratings ranging from 0-7 according to the math, language, and reasoning skills they require, only 27% of all new jobs fall into the lowest two skill categories, compared to 40% of current jobs. 41% of the new jobs will require skills in the three higher skills groups, compared to 24% of current jobs. (30)

Figure 20



Taken from: Graham, Ellen, "If Johnny Can't Read, the U.S. Can't Compete," The Wall Street Journal, Centennial Edition, June 23, 1989, pp. A22-A23.
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The key employment issue of the future isn't whether jobs will be there for people but whether qualified people will be there for jobs. -- **John Naisbitt, *Trends* newsletter.**

Due to a shrinking pool of available workers, there is no longer a surplus from which business can collect employees. American business must step in and help secure the future of their own companies and ultimately, the quality of life in America. -- **Secretary of Labor Elizabeth Dole.**

- U.S. companies invest about 1.5% of their payroll cost on improving employee skills, while Japanese and European firms spent 4% to 6% of their expenses on training their workers. (31)

- The economy must add more than 7 percent new jobs annually to replace those that disappear; this rate implies that in five years, approximately half of all workers will hold new jobs, work for new employers, or start businesses themselves. (32)

- American and Canadian governments must provide rewards or tax incentives for businesses to engage in long-term training, comparable to that provided in western Europe. Sweden and West Germany provide free training in basic skills before workers are laid off, and those who are laid off are given income support for up to three years for retraining. (33)

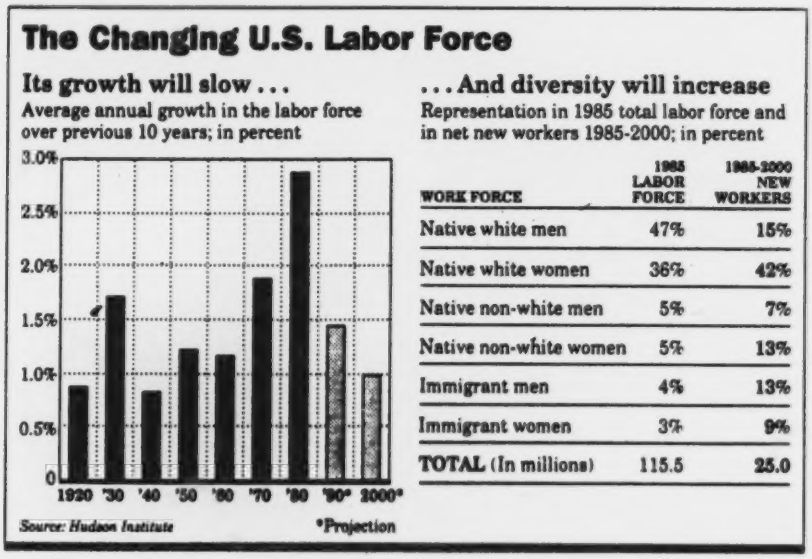
By the year 2000, 75% of all workers currently employed will need retraining because of changes in the nature of existing jobs, and the creation of jobs that require new higher levels of skills. -- **American Society for Training and Development in *Workplace Basics*, 1989.**

- The annual growth of workers joining the labor force is slowing from the 2.2% rate of the period 1972 to 1986 to just 1.2% for 1986 to 2000. (34)

- The Bureau of Labor Statistics projects the labor force to be 139 million in the year 2000, a growth of 21 million persons between 1986 to 2000. This is well below the 31 million added to the labor force between 1972 and 1986. (35)

Figure 21

There aren't many untapped pockets of potential labor in the U.S. .... Because of the low supply of entry-level workers, the days of minimum wages are forever behind us. — **Ronald Kutschner, Associate Commissioner of the Bureau of Labor Statistics.**


The Changing U.S. Labor Force
Its growth will slow ...
Average annual growth in the labor force over previous 10 years; in percent
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0
1920 '30 '40 '50 '60 '70 '80 '90* 2000*
Source: Hudson Institute
*Projection
...And diversity will increase
Representation in 1985 total labor force and in net new workers 1985-2000; in percent
WORK FORCE
1985 LABOR FORCE
1985-2000 NEW WORKERS
Native white men 47% 15%
Native white women 36% 42%
Native non-white men 5% 7%
Native non-white women 5% 13%
Immigrant men 4% 13%
Immigrant women 3% 9%
TOTAL (In millions) 115.5 25.0

Taken from: Bennett, Amanda, "Firms Become A Crucial Agent of Social Change," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A22.
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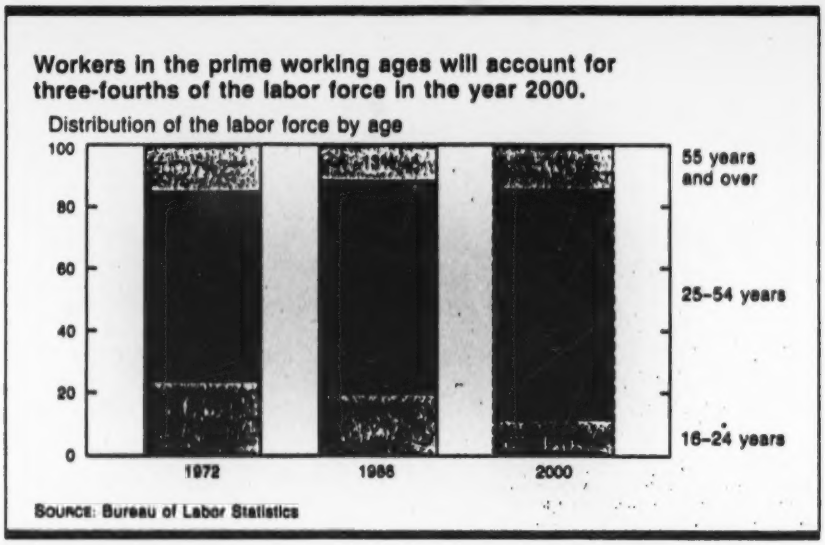
- In 1972, women comprised 39% of the labor force; by 2000, they are projected to comprise 47% of the labor force. (36)

- Prime working age persons (25 to 54) will make up 73% of the labor force in 2000, up from 67% in 1986. (37)

- Even though the older population has grown as a share of the overall population, it is projected to have a lower labor force participation rate in the year 2000. The proportion of youth (16-24 years) will continue to fall: from 23% in 1972 to 20% in 1986, to 16% by 2000. (38)

Figure 22



Taken from: Occupational Outook Handbook, 1988-89 Edition, p. 9.

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- The median age of the labor force in post-World War II era peaked in 1962 at 40.6 years. With the entry of the baby-boom generation into the labor force, the median age dropped, reaching a low of 30.6 years in 1980. By 1986, the median age was 35.3. By 2000, the median age is projected to be 38.9. Unless older workers remain in the labor force in greater numbers, the 1962 median age is not likely to be obtained again. (39)

- Blacks, Hispanics, and Asians will continue to increase as a percentage of the labor force: (40)

Minority Participation in the Labor Force

	1972	1986	2000
Blacks	10%	11%	12%
Hispanics	--	7%	10%
Asians	--	3%	4%

- There are projected to be 16.3 million Blacks in the labor force in 2000, up 3.7 million from 1986. By 2000, Blacks are projected to account for 12 percent of the labor force, up 1 percent from 1986. (41)

- By 2000, Asians will constitute 4 percent of the labor force, up from less than 3 percent in 1986. Asians account for 11 percent of the projected growth in the labor force between 1986 and 2000. (42)

- The Hispanic labor force is projected to increase 74 percent between 1986 and 2000. By 2000, Hispanics are projected to be 10 percent of the labor force, up from 7 percent in 1986. From 1986 to 2000, 6 million more Hispanics will enter the labor force, for a total of 14 million. (43)

- The Hispanic share of labor force growth is 22 percent between 1979 and 1986. Their share of the labor force growth between 1986 and 2000 is projected to be 29 percent ; by subperiod, their share is more impressive -- 27 percent for the years 1986 to 1995, and 32 percent from 1995 to 2000. More than a third of the population growth in the late 1900s is projected to be Hispanic. (44)

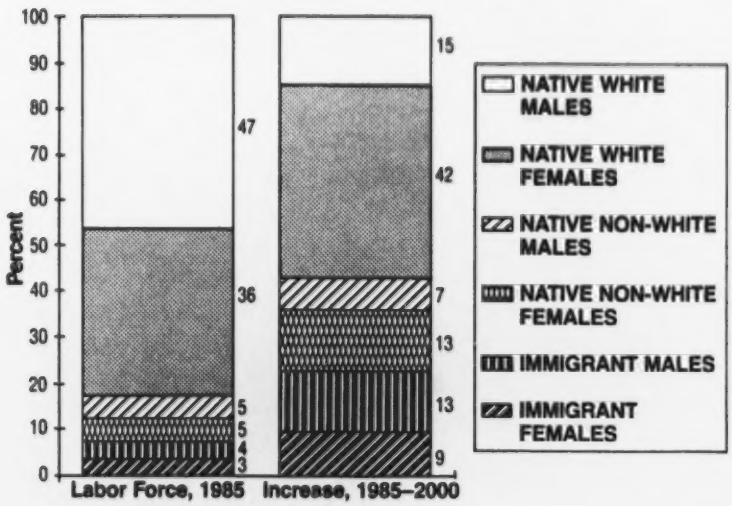
- Immigrants will be the largest share of the increase in the population and workforce since World War I. Approximately 600,000 legal and illegal immigrants are projected to enter the U.S. annually through 2000. (45)

- Minorities will be a larger share of the new entrants into the labor force. White males will comprise only 15% of the new workers between 1985-2000. Women and minorities will comprise the remaining 85%. (46)

- Women are projected to account for more than 60 percent labor force growth between 1986 and the year 2000. (47)

Figure 23

MOST NEW ENTRANTS TO THE LABOR FORCE WILL BE NON-WHITE, FEMALE OR IMMIGRANTS



Source: Hudson Institute

Taken from: Workforce 2000, p. 95.

INADEQUACIES OF AMERICA'S FUTURE LABOR POOL

- The American economy is threatened by a labor pool which lacks basic skills and is increasingly unprepared for entry-level jobs:

    - Nearly one million youth drop out of school every year.

    - Seven out of ten high school students can't write a basic letter seeking employment or information.

    - Three out of five 20-year-olds cannot add up their own lunch bill.

    - Dropout rates of many urban schools are 50% or more. Nationwide, the high school dropout rate is about 30%.

    - One out of every eight 17-year-olds is functionally illiterate.

    - 82% of all colleges and universities must now offer remedial training for students lacking basic skills.

    - In 1988, 44% of all those who applied for jobs at the headquarters of Prudential Insurance weren't able to read at the 9th-grade level.

    - Michigan Bell reported that in 1988, only 2 out of every 15 applicants for clerical positions could successfully complete the required written and typing tests.

    - By 1995, it is estimated that 14 million Americans will be unprepared for the jobs that are available.

If you think education is expensive, try ignorance. -- **Derek Bok, President of Harvard University.**

- In 1989, the National Alliance of Business issued a call for business leadership to take a more active role in implementing an effective national education reform program, and developing relationships with educational institutions. (48)

- General Electric company is supporting programs to get more minority teachers into colleges and universities. Sears, Roebuck and Company, and 14 other companies, have funded a model school that works with center-city students. (49)

- Aetna Life and Casualty Company in Hartford Connecticut is working with local organizations to teach reading and writing to 19- to 24-year-olds. (50)

We are facing a very serious situation. What business needs and what applicants are capable of doing are quickly becoming worlds apart. This could spell trouble for America. -- **Robert Forney, Executive Vice President of DuPont.**

SHORTAGE OF WORKERS WITH CRITICAL TECHNICAL SKILLS

- Between 1989 and 1994, the U.S. will need more than a million new teachers. At current rates, the U.S. will only generate 625,000 people trained to teach; many of these will choose other fields of employment. (51)

- Workers with critical technical skills will be retiring at an increasingly rapid rate. For example, the average age of the nation's 300,000 machinist is 58, yet industry is training only one-fourth of the skilled machinists needed each year. (52)

We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology. This is a clear prescription for disaster. -- **Carl Sagan, *Parade Magazine*, Sept. 10, 1989.**

NURSING SHORTAGE

- America is in its early stages of a critical shortage of nurses. By 1990, the U.S.A. will face a shortage of 390,000 Registered Nurses. (53)

- Today's nurse force remains 97% female; many women are spurning nursing or teaching careers to enter business or other professions. (54)

- In 1988, the Illinois Nurse's Association estimated that 13-25% of the budgeted nursing positions in hospitals across the state were unfilled. (55)

- Hospitals, the largest employers of nurses, have a nation-wide job vacancy rate of approximately 20%, according to the American Nurse's Association. (56)

- 60% of the hospitals surveyed in 1987 by the National Association of Health Care Recruiters said cardiac care and intensive care positions are the toughest nursing positions to fill. (57)

- A 1987 survey of hospitals in Iowa indicated that there were nearly three times more job openings in the state than the previous year. The number of graduates in Iowa's nurse's training programs dropped from 2,370 in 1983 to 1,892 in 1986. (58)

- Employers are luring prospects with promises of bonuses, paid vacation trips, and other perks. Others send nurse recruiters to Europe, the Caribbean, and the Phillipines. In Washington D.C., where over 35 hospitals have more than 1,000 vacancies, some are offering $5,000 bonuses to nurses with intensive care experience or other specialized training. (59)

- Since 1983, enrollment in nursing schools across the country has fallen 30%. Administrators and others say that they see the shortage worsening before it gets better. (60)

- Because of the nurse shortage, the American Medical Association Board of Trustees in October 1988, approved up to four pilot projects to train Registered Care Technologists. The RCT's will be trained by the hospitals employing them, in cooperation with vocational schools or community colleges. An Assistant RCT would undergo 2 months of training, a Basic RCT an additional 7 months, and an Advanced RCT a total of 18 months. The new workers would perform a variety of tasks ranging from bathing patients and caring for wounds to administering routine intravenous medications and caring for cardiac monitors and ventilators. (61)

AMERICAN BUSINESSES ARE BEGINNING TO RESPOND TO THE SHRINKING POOL OF YOUNG AND SKILLED WORKERS

We are looking a lot harder in places that we haven't focused our attention on: the disabled, retired, older workers .... It has nothing to do with altruism or concern about society. It has to do with survival. -- **Madelyn Jennings, Senior Vice President for Personnel at Gannett Company.**

- McDonald's Corporation has responded to the growing shortage of entry-level workers by sponsoring a "McMasters" job training program in Maryland for senior citizens. (62)

- Southland Corporation recruits retarded people in Philadelphia, and trains them at special stores. They work in a variety of jobs, from maintenance to bookkeeping, at the company's 7-11 franchise stores throughout the region. (63)

- Pillsbury Company's Burger King Corporation offers grants of up to $2,000 over two years to fast-food crew members who are attending college or vocational schools. (64)

- Walmart is the largest single job creator in America today. Walmart uses educational incentives to put young associates on a career ladder to management. In 1987, Sam's Wholesale Club began offering Sam's Scholarships to hourly employees with 1,000 hours of company service. Sam Scholars receive up to $2500 to help pay college tuition, and continue to work part-time. (65)

- Many companies are expanding day care as a way of attracting more young mothers. Richard Yerkes, Vice President of U.S. Restaurants Inc., a restaurant chain based in Norristown, Pennsylvania, drafted a plan to help find and subsidize child care for workers, especially during busy lunch hours. (66)

Because of the shrinking numbers of youth entering the workforce, it is predicted that businesses will begin lobbying for an easing of immigration laws to raise the supply of foreign workers. Those hit hardest by the dearth include hotels and restaurants, especially fast food places; convenience stores and other retailers; and businesses needing beginning computer and clerical skills. (67)

GOVERNMENT RECOGNIZES WORKFORCE CRISIS

> *The skills of our workforce have not kept pace with the more complex jobs of today. The skills gap must be bridged if our remarkable economic expansion is to continue and if we are to succeed in the ever-more competitive global marketplace.* -- **U.S. Labor Secretary Elizabeth Dole.** (68)

In 1988, U.S. Labor Secretary Ann McLaughlin, established the Commission on Workforce Equality and Labor Market Efficiency. The Commission's 44 recommendations cover three broad areas:

1. Improving education for young people.
2. Providing lifetime education and training for workers.
3. Improving productivity and efficiency by providing more help for working parents and developing a system to better match workers with jobs. (69)

OCCUPATIONS PROJECTED TO HAVE LARGEST NUMBER OF OPENINGS

Occupations that are expected to have the largest number of openings in the 1990's because of both replacement needs and growth in Iowa are in order of greatest number of total openings:

- Retail salespersons
- Janitors and cleaners
- General managers and top executives
- Farmers, except horticulture
- General office clerks
- Farm workers
- Bookkeeping, accounting, and auditing clerks
- Nursing aides, orderlies and attendants
- Secretaries, stock clerks, salesfloor personnel
- Food preparation workers
- Registered nurses (70)

OCCUPATIONS PROJECTED TO HAVE GREATEST GROWTH OF EMPLOYMENT

Those occupations which are projected to experience the greatest growth of employment (percentage increase over current number) in the 1990's are listed in the following table, in order from greatest to least growth. Medical service occupations heads the table with nursing aides, followed by registered nurses.

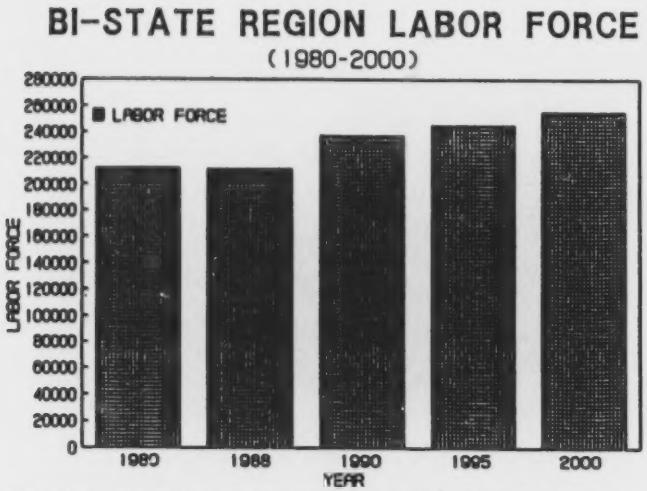
- Nursing aides, orderlies and attendants
- Registered nurses
- Janitors and cleaners
- Teachers, secretaries
- Teachers, elementary
- Maids and housekeeping cleaners
- Licensed practical nurses
- General office clerks
- Receptionists and information clerks (71)

Many parts of Iowa have now outgrown the need to emphasize immediate job creation in economic development. The new emphasis . . should be to improve Iowans' standard of living, to build Iowa's capacity to grow and prosper in the long run. -- ***The Five-Year Economic Development Plan, 1989 update.***

BI-STATE REGION LABOR FORCE

- In 1980, the Bi-State region labor force totalled 211,964 persons; 50% of these were females. In 1988, the labor force totalled 211,147, a decrease of only 0.38%. The regional labor force is projected to increase by 44,570 persons or 21% between 1988 and 2000. (72)

Figure 24



SOURCE: ILLINOIS DEPT. OF EMPLOYMENT SECURITY

II. THE CHANGING WORKFORCE/WORKPLACE

1. Louis Richman, "Tomorrow's Jobs: Plentiful, But . . . ," Fortune, April 11, 1988, pp. 42-56.

2. Rhodes, "A Neglected Challenge: Minority Participation in Higher Education." Speech delivered in May 1987, at the Annual Meeting of the Board of Directors of the Academy for Educational Development, published by the Academy for Educational Development.

3. The National Alliance of Business, Employment Policies: Looking to the Year 2000, p. 3.

4. Richman, "Tomorrow's Jobs: Plentiful, but . . .," pp. 42-56.

5. The National Alliance of Business, Employment Policies: Looking to the Year 2000.

6. William B. Johnston and Arnold H. Packer, Workforce 2000: Work & Workers for the 21st Century, Hudson Institute, Indianapolis, 1987, p. 21.

7. The National Alliance of Business, "The Disappearing Quality of the U.S. Workforce: What Can We Do to Save It?", Supplement to Time, 1989.

8. Ibid.

9. Nan Stone, "The Globalization of Europe: An Interview With Wisse Dekker," Harvard Business Review, May-June, 1989, p. 92.

10. Johnston and Packer, Workforce 2000: Work & Workers, p. 22.

11. The National Alliance for Business, Employment Policies: Looking to the Year 2000, pp. 2-3.

12. Linda Kanamine, "20 Million More Jobs by 2000," USA Today, June 24, 1988. p. B1.

13. David F. Ramacitti and Associates, "We Are Your Answer: A Strategic Marketing Plan for the Eastern Iowa Business and Industry Center," Davenport, Iowa, January, 1988, p. 26.

14. Ibid., p. 26-27.

15. Janet Castro, "Where Did The Gung-Ho Go?", Time, September 11, 1989, p. 54.

16. Ibid.

17. Martha Brannigan, "Help Wanted: The Shortage of Youths Brings Wide Changes to the Labor Market," The Wall Street Journal, September 2, 1986, pp. 1+.

18. "Work in the Twenty-first Century," Futures, December 1986, pp. 827-28.

19. Brannigan, "Help Wanted," p. 1.

20. The National Alliance of Business, Employment Policies: Looking to the Year 2000, p. 4.

21. Richman, "Tomorrow's Jobs: Plentiful, but . . .," pp. 42-56.

22. The National Alliance of Business, Employment Policies: Looking to the Year 2000, p. 4.

23. Ibid.

24. "Family Support for Workers," The Futurist, March/April, 1988, p. 51.

25. Valerie Personick, "Projections 2000: Industry Output & Employment," Monthly Labor Review, September 1987, p. 36.

26. The National Alliance of Business, Employment Policies: Looking to the Year 2000.

27. Ibid.

28. Melinda Voss, "Workplace Basics," The Des Moines Register, April 23, 1989, pp. 1E-2E.

29. Dale Parnell, The Neglected Majority, (Washington, DC: The Community College Press, A Division of the American Association of Community and Junior Colleges, 1985), p. 14.

30. Johnston and Packer, Workforce 2000: Work & Workers, pp. 97-101; and Graham, "If Johnny Can't Read, We can't Compete," Wall Street Journal, Centennial Edition, June 23, 1989, p. A22-A23.

31. Castro, "Where Did The Gung-Ho Go?", p. 56.

32. Richman, "Tomorrow's Jobs: Plentiful, but . . .," pp. 42-56.

33. Lisa Corbella, "Drastic Changes Urged in Training Canada's Workers," The Toronto Star, June 12, 1989, p. A8.

34. Fullerton, "Projections 2000: The Labor Force," p. 19.

35. Ibid.

36. Ibid.

37. Ibid, p. 22.

38. Ibid.

39. Ibid.

40. Ibid, p. 19.

41. Ibid., p. 23.

42. Ibid.

43. Ibid.

44. Ibid., p. 24.

45. Amanda Bennett, "Firms Become a Crucial Agent of Social Change," Wall Street Journal, Centennial Edition, June 23, 1989, p. A22.

46. Ibid.

47. Fullerton, "Projections 2000: The Labor Force," p. 24.

48. The National Alliance of Business, "The Disappearing Quality of of the U.S. Workforce: What Can We Do to Save It?", 1989, (n.p.).

49. Bennett, "Firms Become a Crucial Agent of Social Change," p. A22.

50. Ibid.

51. Graham, "If Johnny Can't Read," pp. A22-A23.

52. The National Alliance for Business, Employment Policies: Looking to the Year 2000, pp. 2-3.

53. Jim Myers, "Rx: More Money, Status and Control," USA Today, August 11, 1987, pp. 1& 2.

54. Ibid.

55. Michelle Dane, "Nursing Numbers Need Nursing Back to Health," The Leader, May 18, 1988, p. A4.

56. Ibid.

57. Cynthia Hubert, "Nursing Shortage Turning Critical: Turnover Rate High," The Des Moines Sunday Register, May 1, 1988, pp. 1-B and 6-B.

58. "Unhealthy Shortage of Nurses Put Grads on Call," Des Moines Sunday Register, April 12, 1987, pp. 1 & 4.

59. Myers, "Rx: More Money," p. 2.

60. Hubert, "Nursing Shortage Turning Critical," p. 4.

61. Geraldene Felton, "Creating a New Category of Worker Won't Solve the Crisis in Nursing," The Chronicle of Higher Education, March 8, 1989, p.B2-B3.

62. Brannigan, "Help Wanted:", pp. 1+.

63. Ibid.

64. Ibid.

65. Richman, "Tomorrow's Jobs: Plentiful, but . . .," pp. 42-56.

66. Brannigan, "Help Wanted," p. 1.

67. Ibid.

68. "Report Claims United States Faces Major Workforce Crisis," Quad City Times, September 2, 1989, p. 5.

69. Ibid.

70. Labor Market Information for Iowa, Iowa Department of Employment Services, June 1989, p. 68.

71. Ibid., p. 76.

72. "Directions for Iowa's Economic Future," The Five-Year Economic Development Plan, 1989 Update, June 1989 Draft Report, Iowa Area Development Group, p. 1. (First draft of the five-year strategic plan for Iowa.)

III.
POLITICAL, SOCIETAL, AND ECOLOGICAL CHANGES

FAMILIES

- In 1955, 60% of the households in the U.S. consisted of a working father, a housewife mother, and two or more school age children. (1)

- By 1980, that family pattern applied to only 11% of the U.S. households, and by 1985 it had decreased to only 7%. (2)

- Of our 80 million households, almost 20 million consist of people living alone. (3)

- Smaller family size has affected the rural areas of Iowa, where farms are being consolidated and operated by fewer, smaller families. This trend has an impact on rural towns in the form of reduced school enrollment, retail trade, and population. (4)

- Of the adult black male population who live in cities, only half of them work, even part-time. The ever-increasing inability of the black male to support a family is the primary reason behind the rise of the female-headed household. (5)

TEENAGE PREGNANCIES

- Teenagers give birth to more than one-half million children each year; 10,000 to mothers under age 15. (6)

- 800,000 teenagers face unwanted pregnancies each year; one-half million will abort. Of the 40% who give birth, more than half will raise their children by themselves. These children will "be at risk". (7)

- The American rate of teenage births is more than twice as high as any other western nation. (8)

Births by 15- to 19-Year-Olds
(Per Thousand)

United States	96
Blacks	163
Whites	83
Netherlands	14
Sweden	35
France	43
England	45
Canada	44

- In September, 1989, Rock Island High School (Illinois) announced that it will provide on-site day care for children of teenage mothers attending the school. (9)

- Most women work because they have to. (10)

- Women still earn less than men doing the same job; 61.1¢ to every dollar that a man earns. (11)

- In 1987, about 65% of women of childbearing age worked. (12)

- Women continue to enter the workforce in increasing numbers. Restaurants, housekeeping, childcare, and many other service industries are rapidly growing in order to accommodate this transformation of labor. (13)

- In 1982, almost 48% of mothers with children under the age of one held jobs. Sixty-seven percent of mothers with children under three years old worked. More than half of all school-aged children had moms who worked outside the home. (14)

- 71% of working mothers with children under the age of 18 have full-time jobs. (15)

- The United States is the only industrialized nation without a national policy regarding parental and maternity leave. Close to 60% of working women have no job protection if they should become pregnant. (16)

- Only five states guarantee women paid maternity leave: California, New Jersey, Hawaii, Rhode Island, and New York. (17)

- In a rare move to entice new mothers to return to work, Measurex Corporation of California awards new mothers $150 a month from the time they return to work until the baby is a year old. Track Data Corporation gives $1,000 bonuses to parents for each new child. Apple Computer, Inc. bestows a $500 gift to every newborn or adopted child. (18)

- Only 5% of U.S. companies assist their employees with child care. About 300 companies have helped initiate day-care facilities. (19)

- About 40% of workers over the age of 40 provide care to their parents; about 12% of women who care for their aging parents must quit their job to do so. (20)

THE DECLINE OF ECONOMIC FORTUNES OF YOUNG AMERICANS

- In 1986, males 20-24 with high school diplomas earned 28% less in constant dollars than the comparable group of young adults in 1973. (21)

- High school dropouts in the same age group earned 42% less in constant dollars in 1986 than in 1973. (22)

- In 1985, only 43.7% of non-college educated 20-24 year old males earned enough to support a family of three above the poverty level compared to 60% in 1973. (23)

- More non-college enrolled youth under 20 are working part-time than full-time. (24)

- 30% of all households headed by a person under age 25 had incomes below the poverty level in 1985 -- nearly double the rate of the early 1970's. (25)

CHANGING VALUES IN WESTERN SOCIETIES

Traditional Values	New Values
Self-denial ethic	Self-fulfillment ethic
Higher standard of living	Better quality of life
Traditional sex roles	Blurring of sex roles
Accepted definition of success	Individualized definition of success
Traditional family life	Alternative families
Faith in industry, institutions	Self-reliance
Live to work	Work to live
Hero worship	Love of ideas
Expansionism	Pluralism
Patriotism	Less nationalistic
Unparalleled growth	Growing sense of limits
Industrial growth	Information/service growth
Receptivity to technology	Technology orientation

Source: Joseph T. Plummer, "Changing Values: The New Emphasis on Self-Actualization," The Futurist, January-February 1989, pp. 8-13.

The top third of America's young people is the best educated in the world, with the middle third slipping into mediocrity, and the bottom is at Third World standards. -- **Pat Shult, Author of High Flex Society.**

- 15% of American youths entering school have mental or physical handicaps; 10-15% speak a first language other than English; 24% of them are living in poverty. (26)

- Many youngsters lack attention and supervision in part because their parents are too busy making a living. For women with children under 18, the percentage who work grew from 54% in 1980 to 65% in 1988. Today 24% of families with children are headed by a single parent. (27)

- According to the Children's Defense Fund, a child advocacy group based in Washington, D.C., more than 1.9 million cases of child abuse and neglect were reported in 1986. This is a 50% increase over the previous 5 years. Child abuse and neglect have been shown to occur more frequently in poor families. As the number of children that reside in poor families increases, it is anticipated that the number of children experiencing abuse and neglect will also increase. (28)

- The number of children reported abused and neglected almost doubled between 1980 and 1987, from 1.2 million to 2.2 million. (29)

- Poor children are roughly twice as likely to have a major health problem that limits their school attendance, according to Congress's U.S. Children and Their Families: Current Conditions and Recent Trends, 1987. (30)

- The rate of suicide among teens age 15 to 19 has more than doubled since 1960. (31)

- Teenagers often adopt the values of their peer group rather than those of parents and teachers. (32)

- Twenty-three million Americans are illiterate at the 4th grade level, and 23 million more are illiterate at the 9th grade level. Each year, an estimated 700,000 individuals graduate from high school unable to read or write at the 9th grade level. The number of functional illiterates is expected to increase by 2.3 million each year, including 1.3 million who are new immigrants. (33)

- Among 17-year-olds, 40% cannot draw inferences from written materials, and 66% cannot solve math problems with several steps. (34)

- Youth unemployment is expected to increase, even though the absolute number of young people is on the decline. Youth unemployment is largely attributed to continued ineffective vocational counseling and job placement and lack of basic literacy skills for youth, particularly minorities. (35)

  Black male teenagers with work experience are expected to continue to decline in number. From the mid-1960's to the mid-1970's, black male teenagers with work experience dropped from 67% to 47%, while the percent of white male teenagers remained the same. (36)

  Longitudinal research shows that joblessness during youth has a long-term harmful effect on success in the labor market. (37)

- Between 1983 and 1987, arrests of juveniles under age 18 for drug-abuse violations grew 5 percent even though the total size of the teenage population shrank 2 percent. (38)

- Between 1983 and 1987, arrests of those under 18 for murder jumped 22.2 percent, for aggravated assault 18.6 percent, and for rape 14.6 percent. (39)

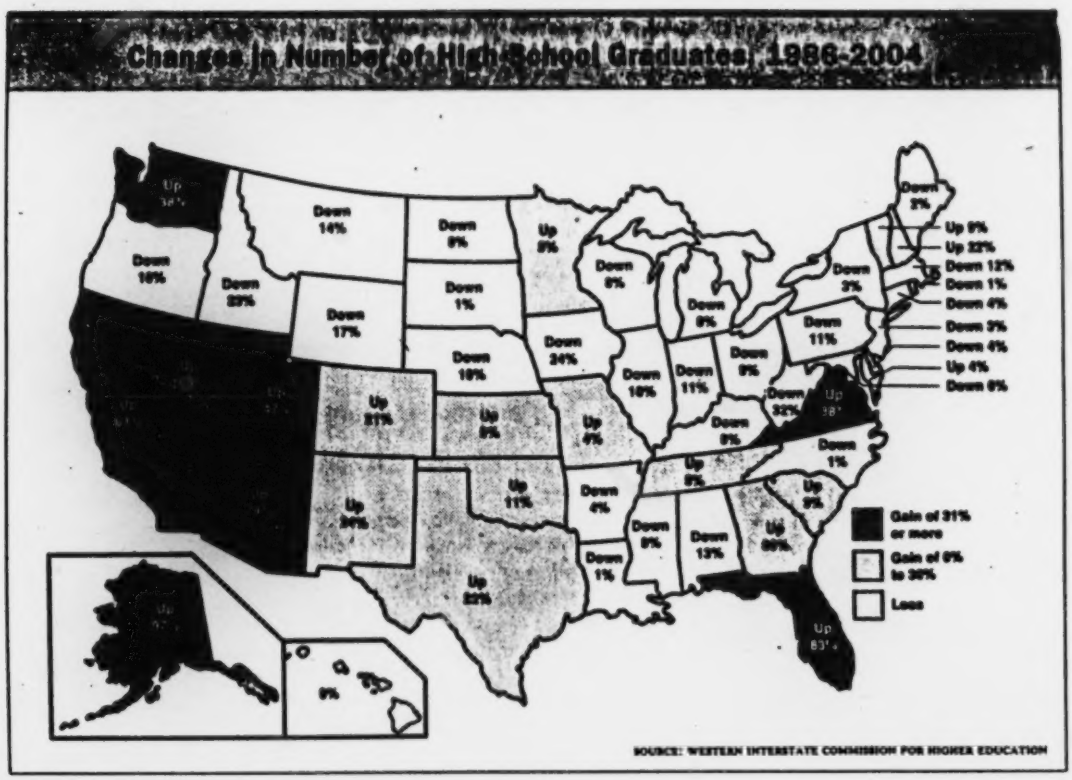
- Inner-city schools are being filled by poor, minority, non-English-speaking students who are most at risk of failure. Schools in poor neighborhoods are likely to evolve into community social-service centers, providing everything from prenatal counseling to job placement. (40)

- There are over 16,000 local school districts functioning as separate units throughout the United States. There is a growing concensus for national performance standards. "How long can we continue to spend $180 billion a year on education and not evaluate the results?" says Ernest L. Boyer, President of the Carnegie Foundation for the Advancement of Teaching. (41)

- As the diversity of our population continues, companies and employers will find themselves more involved in such issues as education, child care, literacy, care for the elderly, broken homes, and teen pregnancies. (42)

Most young adolescents attend massive, impersonal schools, learn from unconnected and seemingly irrelevant curricula, know well and trust few adults in school, and lack access to health care and counseling. -- **Middle School Task Force of the Carnegie Council on Adolescent Development, 1989.**

Figure 25


Changes in Number of High School Graduates, 1986-2004
Gain of 31% or more
Gain of 0% to 30%
Loss
SOURCE: WESTERN INTERSTATE COMMISSION FOR HIGHER EDUCATION

Taken from: Mary Crystal Cage, "High-School Graduates: Some States Face Sharp Drop; Others Big Growth," The Chronicle of Higher Education, March 1, 1989, p. A18.

- The decline in the birth rate has resulted in a significant decline in students in the traditional 18- to 21-year-old cohort.

- The 18-year-old cohort graduating from high school in the academic year 1992-93 will be the smallest since the Baby Boomers began graduating in 1964. The graduation cohort will reach a low of approximately 2.29 million graduates. (43)

- The number of high school graduates will then gradually increase to about 2.67 million annually by 1999-2000 academic year. (44)

- Florida is the only state east of the Mississippi River expected to have an increase in the number of high school graduates between 1992 and 2000. During this same period, all north central states (including Iowa) will experience declines; states of growth will be in the west and southwest (Texas will increase by 49% and California by 18%). (45)

HIGH SCHOOL COMPLETION

- Today, about 30% of students entering our school systems do not complete high school. (46) In most inner city high schools, the dropout rate exceeds 50%; in Japan, the dropout rate is 5%. (47)

- In 1985, Iowa ranked 3rd in high school graduation; 5th in 1988. (48)

1985 High School Graduation Rates

1.	Minnesota	86.0%
2.	North Dakota	84.9%
3.	Iowa	84.8%
4.	South Dakota	82.8%
5.	Wisconsin	82.3%
6.	Nebraska	81.3%
7.	Montana	80.9%
8.	Kansas	80.5%
9.	Utah	80.2%
10.	Wyoming	80.0%
41.	California	68.0%
42.	Kentucky	67.3%
43.	Alabama	67.1%
44.	North Carolina	67.1%
45.	Tennessee	66.7%
46.	New York	65.9%
47.	Georgia	64.3%
48.	Florida	63.7%
49.	Louisiana	63.4%
50.	Mississippi	61.8%

Taken from: Hodgkinson, Higher Education: Diversity is Our Middle Name, p. 9.

- The Japanese-Americans have the highest high school graduation rate of all groups of students. (49)

1985 High School Completion Rates

Japanese-Americans	96%
Chinese-Americans	90%
Filipino-Americans	89%
Koreans-Indians-Americans	94%
Vietnamese-Americans	76%
White	87%
Black	74%

Taken from: Hodgkinson, Higher Education: Diversity is Our Middle Name, p. 5.

- In 1988, 13.6% of white 18-21 year-olds had dropped out of high school. Among Blacks, the rate was 17.5%, compared to 29.3% for Hispanics. (50)

America's role in the Twenty-first Century in research and technology will be determined by the U.S. ability to produce physicists, chemists, mathematicians, aeronautic engineers, and medical researchers. Present trends do not point to a promising future. (51)

- In an Educational Testing Service (ETS) study of 5 countries and 4 Canadian provinces, American 13-year-olds ranked last in math and second from last in science. (52)

- The International Association for the Evaluation of Educational Achievement conducted a survey of 17 countries; U.S. 9th graders tied with Singapore and Thailand for 14th place in science. (53)

- The 1983 study Nation at Risk indicated that half of the U.S. newly employed math and science teachers were not qualified to teach their subjects. (54)

- By the year 2000, the U.S. will need between 450,000 and 750,000 more chemists, biologists, physicists, and engineers than it is expected to produce. (55)

- Less than 1% of college freshmen in 1988 indicated that they intend to major in math, compared to 4% 20 years ago. (56)

- In 1988, Physics and Chemistry majors fell from 3% to 1.5%. (57)

- One third of Ph.D.'s awarded in the natural sciences and engineering in 1988 were to foreigners, compared to 25% ten years ago. (58)

Science and math are the substance of this age, just as exploration and warfare were the substance of other ages. Science is the way to prepare Americans for the Twenty-first Century. -- **William Baker, former chairman of AT&T Bell Telephone Laboratories. (59)**

- In 1968, funding from the National Science Foundation (NSF) totalled $130 million. In 1982, Reaganomics resulted in the NSF Educational Division budget cut to zero. Although the FY90 NSF funding will total $210 million, of which $147 million will go for science and engineering education for kindergarten through the high school, it has a tremendous problem to tackle. (60)

- Historically, women and minorities have shown less interest in science than white males; in 1987, Blacks earned only 2.6% of Bachelor of Science degrees awarded in the U.S., 1.8% of the Science and Engineering doctorates. Hispanics earned 2% of the Bachelor of Science degrees, 1% of the doctorates in Science and Engineering. (61)

- Since 1970, 42 states have increased their math requirements and 36 states have raised their science requirements for high school graduation. (62)

- In Japan, parents supplement their children's schoolwork with "juku" which is remedial and preparatory tutoring in mathematics, sciences, language, and other subjects. The number of profit-making "juku" enterprises has grown rapidly in the past decade, and now there are more than 35,000 of these private enterprises competing for students. (63)

Science is more than a body of knowledge. It is a way of thinking . . .science invites us to let the facts in . . . . It counsels us to carry out tentative hypotheses in our heads to see which best match the facts. It urges on us a fine balance between no-holds-barred openness to new ideas, however heretical and the most rigorous skeptical scrutiny of everything -- new ideas and established wisdom. We need wide appreciation of this kind of thinking. It works. It's an essential tool of democracy. -- **Carl Sagan (64)**

HIGHER EDUCATION

- In 1985, 52% of our nation's college students were 21 years of age or older; approximately 20% were 30 years of age or older. (65)

- Students in the "non-traditional" age groups do not require all the services 18-21 year old students usually do: housing, food service, entertainment, extensive medical programs, and recreation-facilities. (66)

- U.S. higher education experienced unprecedented growth from the mid-1960's to 1975 as the pool of traditional college-age Americans swelled with the "baby boomers". Enrollment rates held fairly steady for a few years after 1975, until an influx of adult students (primarily women) triggered another enrollment surge, resulting in a peak collegiate enrollment of 12.5 million students in 1983. (67)

- The enrollment rate for older students doubled from 1970 to 1983, from 2.4 million to 5.0 million students. This trend is expected to continue with an estimated 5.7 million older students enrolling in colleges and universities by 1993 -- a 13% enrollment boost from 1983 to 1993. (68)

- Between 1983 and 1993, it is expected that the 18- to 24-year-old group will shrink by 18%. Currently, only 2 million of the 12 million college students can be classified as traditional students, that is, 18 to 22 years of age, attending college full time and living on campus. (69)

- About 50% of the U.S. adult population participates in some form of post-secondary education, of which only 12 million people attend colleges and universities. (70)

- A "second system" of post-secondary education serves the majority of adult learners. This "second system" is composed of labor union educational programs, proprietary institutions, community education centers, government, military, business, and public service agencies. This "second system" is teaching 3 out of 4 adults being educated in the U.S.; Colleges and universities are educating about 1 in 4 adults. (71)

- About 400 corporations in the U.S. have "in-house" education and training programs for employees. (72)

. . . we do not yet know all the reasons for the declining interest of minorities in higher education . . . . It seems to me that there are five possible responses to this situation: We must increase our efforts in recruiting, improve our retention, provide adequate support services, facilitate employment in graduate and professional study, and foster wider partnership with schools . -- **Frank H. T. Rhodes.**

- The graduate school of the U.S. Department of Agriculture annually enrolls about 12 million students, roughly equal to that of all U.S. colleges and universities. American Telephone and Telegraph (AT&T) has an annual budget of approximately $1.7 billion for employee education and training. (73)

- The shortage of higher education faculty anticipated in the mid-1990's has already arrived in some fields. The sixth annual survey conducted in 1989 of senior academic administrators at 366 institutions by the American Council of Education found:

    - 40% of senior academic administrators have trouble finding qualified people for full-time positions in computer science

    - 33% have difficulty filling positions in the business area

    - 25% have vacant positions in mathematics and the health professions for which they could not find qualified personnel (74)

Minorities, like women, are handicapped by low expectations, but they also suffer from declining Federal student aid, a scarcity of minority faculty, and inadequate academic preparation. -- **Susan Tifft, *Time*, September 11, 1989, pp. 68-70.**

- Colleges and universities will need to hire 37% more new professors in 2003 than they had for the academic year 1989-90. The increased need is due mostly to the large cohort of professors hired in the 1960's who will be retiring together. (75)

  While a 16.2% increase in the number of new professors needed is projected between 1990-98, the number of new Ph.D. recipients is expected to rise by only 2.9%. (76)

  Throughout the 1990's, the replacement need for new faculty will be greatest in the humanities. After 2000, the replacement need will be greatest in the sciences. (77)

- 20% of the college graduates in June, 1985, entered jobs that required no college education at all. (78)

- Almost all the student diversity in higher education (ethnicity, age, and social background) is handled by community colleges. (79)

- The U. S. may need up to 1 million teachers by the year 2000, but only 8% of the 1.6 million college freshmen are even interested in teaching as a career. Half of the new hires leave teaching within 7 years. (80)

- The 1979-80 academic year was the first year in the history of American higher education in which the number of females attending exceeded the male enrollment. (81)

- Foreign student enrollment at U.S. colleges and universities continues to grow. The primary nations from which these foreign students come are: Taiwan, Malaysia, Republic of Korea, India, Iran, and the Peoples Republic of China. (82)

- In 1984, 19.3% of all doctoral degrees in the United States were awarded to foreign students. 52.9% of all Engineering doctorates granted by American institutions were awarded to foreign students in 1984. (83)

- Between 33% and 50% of all college students now leave college in debt. (84)

- The number of Bachelor's degrees awarded in Business and Management has grown to make this field the Number One area of study of the 14 major program areas grouped together by the Department of Education Center for Educational Statistics. In 1973-74, it was a distant third, behind Education and Social Sciences. The number of degrees awarded in business and management totalled more than twice the number awarded in Social Sciences. (85)

MINORITY PARTICIPATION IN HIGHER EDUCATION

- Although the number of minority youths in the 18- to 20-year-old cohort has increased since the mid-1970's, and our high school graduation rates also have increased, a smaller percentage of that cohort is now attending college. (86)

- College participation rates for eligible minority students between 1979 and 1982 reveal an 11% drop for blacks and a 16% drop for Hispanics, despite a percentage increase in the high school graduation rate for these groups. (87)

- In 1984, minority enrollment in all types of higher education institutions was 17.4 percent. When you look at the five states with the largest higher education enrollments, their percent of minority enrollment is as follows: (88)

California	29.6%
New York	20.8%
Texas	25.4%
Illinois	19.4%
Pennsylvania	9.4%

- The percentage of degrees awarded to minorities decreases as one moves up from the undergraduate to the graduate levels. The one exception is Asian students, who have increased their participation at all levels of higher education. (89)

- In 1984, 43% of the doctorates obtained by Asian students were in the physical and life sciences, and 25% in engineering. (90)

- Black females are increasing their share of obtaining graduate degrees at every level at a disproportionately higher rate than black males. (91)

- In 1984, minorities earned only 11.2% of all doctoral degrees awarded in the U.S., and the vast majority of these degrees were in education and the social sciences. In 1984, Blacks earned only 15 of the Ph.D.'s awarded in engineering, only 44 of those awarded in the physical sciences, and only 3 in computer science. (92)

- In 1988, 22% of MIT's Freshman class was Asian-American. (93)

Unless these groups (Hispanics, Blacks, American Indians) participate more fully in higher education, the nation will face a serious shortage of skilled labor and an expansion of an under class that will place increasingly heavy burdens upon our welfare and social service systems. Of equally serious concern are the loss of cultural richness, the wasted human potential, and the lack of minority leadership that these trends portend. In addition, these trends are likely to produce greater ethnic tensions, both on our campus and in society at large, weakening our already weak position in global markets and increasingly separating us from the developing world. -- **Frank H. T. Rhodes, President, Cornell University. (94)**

ATTITUDES TOWARD HIGHER EDUCATION

- A 1985 nation-wide survey indicated 40% of American adults would like to obtain further education, up from 16% in 1983.
    - 26% favored vocational technical education
    - 21% favored public 2-year institutions (95)

INCREASED AWARENESS OF THE VALUE OF A COLLEGE EDUCATION

According to a 1987 Gallup survey, 64% of Americans rate a college education as "very important" in getting ahead, up from 36% in 1978.

Table 10

Iowa's Higher Education

Higher education:	
Public 4-year institutions	3
Public 2-year institutions	20
Private 4-year institutions	36
Private 2-year institutions	6
Total	65
Vocational institutions:	96

Students

Enrollment:	
At public 4-year institutions	69,335
At public 2-year institutions	42,672
At private 4-year institutions	42,898
At private 2-year institutions	3,325
Undergraduate	135,016
First-time freshmen	35,439
Graduate	17,120
Professional	6,094
Total	158,230
Enrollment highlights:	
Women	50.8%
Full-time	72.7%
Minority	4.4%
Foreign	4.0%
10-year change in total enrollment	Up 25.8%
Degrees awarded:	
Associate	7,236
Bachelor's	16,450
Master's	2,775
Doctorate	608
Professional	1,315

Residence of new students: State residents make up 82% of all new college students enrolled in Iowa; 84% of all Iowa residents who attend college do so in their home state.

Proportion of all minority students who enroll at:	
Public institutions	71.4%
Private institutions	28.6%
4-year institutions	71.5%
2-year institutions	28.5%

The Chronicle of Higher Education Almanac, September 6, 1989, p. 46.

- Ex-urban boom towns are the urban trend of the late Twentieth Century. They are the result of a steady march out of the city by smaller companies searching for cheaper office space, affordable housing, and fewer traffic jams. These communities are sprouting on the fringes of dozens of U.S. cities, beyond the traditional suburbs and shopping malls. (96)

  Ex-urban boom towns have sprung up all over the U.S. The first sign is usually a few office buildings. Once they are filled, the race begins. Houses are built, more office buildings rise, fast food outlets arrive, and so do the more pioneering hotel chains, such as Ramada Inn and Holiday Inn. As the boom continues, there is another wave of national chains: Red Lobster, Denny's, Pier 1 Imports, and a Marriott Hotel. (97)

  A strategic priority of Marriott Hotels is to spot this trend; from 1985-88, Marriott put its Courtyard Hotels in more than 100 such growth areas. In 1989, Marriott plans to open 30 more new Courtyard Hotels. (98)

  These new boom towns are not without their labor problems: they're inconvenient for core, inner-city workers who statistically take the low-paying, but necessary jobs, like maintenance or restaurant kitchen work. If the prospective workers can't or won't make the long "reverse commute", a labor shortage can arise, perhaps even while there is a surplus of workers in the nearest city. (99)

> *They (ex-urban boom towns) are incubators for hundreds of small companies that are creating thousands of new jobs . . . . This phenomena is reshaping the economic and social life of many U.S. cities and towns.* -- ***The Wall Street Journal, Centennial Edition.***

Figure 26

New Frontier: Exurban Boom Towns

Fast Growing Urban Areas

Ranked by population increase, in thousands.

AREA	1986	2010	INCREASE	PERCENT CHANGE
Anaheim / Santa Ana, Calif.	2,167	3,920	1,753	81%
Los Angeles / Long Beach	8,296	10,004	1,708	21
Atlanta	2,560	4,118	1,557	61
Dallas	2,401	3,789	1,388	58
Tampa / St. Petersburg / Clearwater, Fla.	1,917	3,198	1,284	67
Phoenix, Ariz.	1,900	3,176	1,276	67
Washington	3,563	4,784	1,221	34
San Diego	2,201	3,278	1,077	49
Houston	3,231	4,218	988	31
Orlando, Fla.	898	1,847	949	106
Riverside, Calif.	2,001	2,896	895	45
Oakland, Calif.	1,934	2,709	775	40
Nassau / Suffolk counties, N.Y.	2,635	3,335	700	27
Fort Lauderdale / Hollywood / Pompano Beach, Fla.	1,142	1,799	657	58
West Palm Beach / Boca Raton / Delray Beach, Fla.	756	1,409	653	86
Sacramento, Calif.	1,291	1,931	639	50
Boston / Lawrence / Salem / Brockton	3,705	4,328	623	17
Minneapolis / St. Paul	2,295	2,909	614	27
San Francisco	1,588	2,193	605	38
Denver	1,633	2,195	562	34
Philadelphia	4,826	5,371	546	11
Chicago	6,188	6,668	480	8
Middlesex / Somerset / Hunterdon counties, N.J.	950	1,428	478	50
Austin, Texas	726	1,200	473	65
Baltimore	2,280	2,745	465	20
San Antonio, Texas	1,276	1,739	463	36
San Jose, Calif.	1,402	1,848	447	32
Seattle	1,751	2,192	441	25
Miami / Hialeah, Fla.	1,770	2,206	437	25
Raleigh / Durham, N.C.	651	1,087	436	67
Total U.S.	**241,038**	**293,441**	**52,404**	**22%**

Source: Woods & Poole Economics. Note: Due to rounding, numbers may not add

Taken from: Wysocki, Bernard, and Michael J. McCarthy. "Latest New Frontier: Ex-Urban Boom Towns." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A14.

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Unless the international community can reverse the trend, 25% or more of the Earth's species of animals, plants, microbes, and fungi are in danger of extinction, reports a National Science Foundation study released August 18, 1989. The teaching of biology and the environment is as important to the national interest as early education in mathematics and other sciences. (100)

Lester Brown and others at the Worldwatch Institute in Washington, D.C. recently checked the vital signs of Earth and came up with the following measurements of its vital signs:

- "Tropical forests shrinking by 11 million hectares per year; 31 million hectares in industrial countries damaged by air pollution or acid rain."
- "An estimated 26 million tons of topsoil lost annually in excess of new soil formation."
- "Some 6 million hectares of new desert formed annually by land mismanagement."
- "Thousands of lakes in the industrial north are now biologically dead; thousands more dying."
- "Underground water tables falling in parts of Africa, China, India, and North America as demand for more water rises above aquifer recharge rates.
- "Extinctions of plant and animal species together now estimated at several thousand per year; one-fifth of all species may disappear over the next 20 years."
- "Some 50 pesticides contaminate ground water in 32 American states; some 2,500 U.S. toxic waste sites need cleanup; extent of toxic contamination unknown."
- "Mean temperature projected to rise between 1.5 degrees and 4.5 degrees centigrade between now and 2050."
- "Sea level projected to rise between 1.4 meters and 2.2 meters by 2100."
- "Growing 'hole' in the Earth's ozone layer each spring suggests a gradual global depletion could be starting." (101)

THE DEFORESTATION OF THE AMAZON

- The river and forest system of the Amazon basin covers 2.7 million square miles (almost 90% of the area of the contiguous U.S.); it stretches into 8 countries besides Brazil: Venezuela to the North, Peru to the West, and Bolivia to the South. (102)

Unless things change, the forests will disappear. -- **Philip Fearnside of Brazil's National Institute for Research in the Amazon.**

- Second in length to the Nile, the Amazon delivers an average of 170 billion gallons of water per hour to the Atlantic Ocean -- 60 times the flow of the Nile. (103)

- A U.S. National Academy of Sciences report issued in 1982 estimated that a typical 4-square-mile patch of rain forest may contain: (104)

    - o 750 species of trees
    - o 125 kinds of mammals
    - o 400 types of birds
    - o 100 types of reptiles
    - o 60 types of amphibians
    - o Each type of tree may support more than 400 insect species

- Approximately 12% of the Amazon has been deforested. (105)

- In 1988, an estimated 12,350 square miles of Brazilian rain forest (an area larger than Belgium) was burned. (106)

- The fires set by ranchers and homesteaders in the Amazon region are spilling into the atmosphere 7% of the carbon dioxide responsible for the global warming process known as the "greenhouse effect". (107)

- The burning of the Amazon could lead to climatic chaos.

    The huge volume of clouds generated by the Amazon plays a major role in the way the sun's heat is distributed around the globe.

    The Amazon region stores at least 75 billion tons of carbon in its trees; when burned, carbon dioxide is spewed into the atmosphere. The torching of the Amazon could magnify the greenhouse effect -- the trapping of heat by atmospheric carbon dioxide. (108)

- When the trees are gone, the Amazon's soil is nutrient-poor and ill suited to agriculture. Once cleared, the soil is so poor that crop yields begin to deteriorate substantially after three years.

The rain forest is a virtually untapped storehouse of evolutionary achievement that will prove increasingly valuable to mankind as it yields its secrets. -- **Eugene Linden, *Time*, September 18, 1989.**

Figure 27

- Ecologists are concerned with the proposed completion of the Trans-Amazon highway, a system of roads that run west from the coastal city of Recife toward the Peruvian border, eventually all the way to Lima. The completed system would provide the State of Acre in the western Amazon with a Pacific outlet for its tropical hardwoods, which are in high demand in Japan. It would open the western Amazon to commercial exploitation and devastation. (109)

- The seringuerious (rubber tappers) achieve a higher standard of living by harvesting the rubber from the forest, than do farmers who cut the forests. (110)

The Amazon is a library for life sciences, the world's greatest pharmaceutical laboratory, and a flywheel of climate. It's a matter of global destiny. -- **Thomas Lovejoy, Smithsonian Institution.**

Americans produced 160 million tons of solid waste every year -- more than three pounds per person each day -- which is the highest per capita rate among industrialized nations. (111)

- The U.S. annually produces 1.6 billion pounds of plastic, soda, milk, and water bottles -- enough to fill a line of dump trucks stretching from New York City to Cleveland. Currently, no more than 0.5 percent of all U.S. plastic products are degradable. (112)

- The cost of landfill disposal has skyrocketed in some locations, doubling and even tripling. (113)

- Landfill sites are nearing capacity, and acceptable space for such sites are in short supply. (114)

- The EPA is hoping that by 1992 to reduce the waste stream by 25% through recycling and "source reduction", that is, reducing the amount of material used to make disposable products. (115)

- Only 1 percent of all plastic waste is being recycled, in contrast to 25 percent of used aluminum. (116)

- Recycling plastic is relatively cheap. Second-generation plastic costs 40¢ per pound, about 20¢ less than new pure plastic. (117)

- Polyethylene terephthalate (PET) used for soft-drink bottles and other containers, high-density polyethylene (HDEP) used for milk and juice jugs, and polystyrene foam used for coffee cups, egg cartons, and other foam products all are currently being recycled and used to make products with a longer service life. Industry analysts project that 50% of all PET containers will be recycled by the mid-1990's. (118)

- About 130 companies, ranging from Du Pont and Dow Chemical to smaller firms like Wisconsin's Midwest Plastic Materials and Iowa-based Hammer's Plastic Recycling, are involved in reincarnating used plastics. Some 20 new firms are entering the business each year. (119)

By the year 2000, more plastics will be recycled annually than any other recyclable material. -- ***Time*** **special advertising section, Published by the Council for Solid Waste Solutions.**

- In April 1989, Du Pont announced that it would form a joint venture with Waste Management to build the U.S.'s largest plastic-recyling operation. The facility will open in 1990, and will separate and clean 40 million pounds of material each year. (120)

- Three states (New Jersey, Rhode Island, and Florida) require residents to sort their garbage for collection. (121)

- State or local laws requiring some form of recycling have been enacted in several states, including New Jersey, Connecticut, Florida, Oregon, and Pennsylvania. (122)

- Twenty states are considering some kind of ban or restriction on nonrecyclable plastics. Minneapolis and St. Paul have passed laws that, beginning in 1990, will prohibit nondegradable and nonrecyclable plastic food containers, and a similar law took effect this summer in Suffolk County, New York. (123)

America has entered into the era in which landfilling will no longer be the primary method of garbage disposal. Its future role will be as a last resort. As an alternative, recycling offers an assortment of benefits.

- The environmental movement is being reborn. The public is concerned about such issues as toxic waste disposal and global warming. The demands and costs for environmental protection are expected to rise significantly in the years to come. (124)

- Representatives from 86 countries indicated that they favor a total ban on certain chlorofluorocarbons (CFC), man-made chemicals believed to be destroying the ozone, by the end of the century at the latest. This goes beyond the 1987 Montreal Protocol, which called for a 50 percent cut in CFC manufacture by 1999. The U.S. and European Community had agreed to a similar proposal earlier this year. (125)

- In June, 1989, George Bush announced that major steps be undertaken to reduce acid rain, smog caused by auto exhaust, and toxic chemicals discharged into the air. The cost to carry out this plan is high: $14 billion to $19 billion annually by the end of the year 2000. The plan calls for: (126)

    - 50% slash in acid rain producing sulphur-dioxide emissions

    - 40% tightening of emissions standards from hydrocarbons from automobile tailpipes

    - 70% cut in cancer-causing toxic chemicals poured into the atmosphere

    - Making cars that run on fuels cleaner than gasoline, probably methanol, though ethanol or compressed natural gas could also be used

Approximately 20% of the Superfund sites could be cleaned up biologically.
-- **Lewis Fernandez, CEO of Cellgen, a biotech firm.**

IOWA'S RANKING AGAINST 50 U.S. STATES

Education

- 5th in high school graduation rate
- 11th in pupil/teacher ratio
- 27th in K-12 spending per student
- 29th in average teacher salary
- 35th in higher education spending per student
- 14th in adult literacy
- 16th in beginning teacher salary

Quality of Life

- 4th in highway condition
- 27th in energy costs per kilowatt hour
- 29th in sewage needs per capita
- 22nd in urban housing costs
- 46th in doctors per 1,000 population
- 11th in crime rate per 100 population
- 2nd in low infant mortality
- 1st in air quality
- 37th in bridge condition

Taken from: Iowa's Future: A Quality Economy for Tomorrow, Published by The Future Project, Sponsored by Iowa Newspaper Association, 1989, p. 13.

ENDNOTES

III. POLITICAL, SOCIETAL, AND ECOLOGICAL CHANGES

1. Hodgkinson, All One System.

2. Ibid.

3. Ibid.

4. Labor Market Information for Iowa, Iowa Department of Employment Services, p. 108.

5. "Why the Underclass," p. 123.

6. Hodgkinson, Higher Education, p. 5.

7. Ibid.

8. Ibid.

9. Lee Nelson, "Rocky Will Get Child Center," Quad City Times, September 13, 1989, p. 25.

10. Barbara Kantrowitz, et al, "Changes in the Workplace," Newsweek, March 32, 1986, p. 57.

11. Ibid.

12. Ibid.

13. Labor Market Information for Iowa, Iowa Department of Employment Services, p. 108.

14. Kantrowitz, "Changes in the Workplace," p. 57.

15. Barbara Kantrowitz, "A Mother's Choice," Newsweek, March 31, 1986, p. 46.

16. Kantrowitz, "Changes in the Workplace," p. 57.

17. "Your Baby or Your Job," The Economist, January 24, 1987, p. 26.

18. "Bonus for Having Babies," The Des Moines Register, September 12, 1989, p. 10T.

19. "For American Business, A New World of Workers," Business Week, September 19, 1989, p. 113.

20. Ibid.

21. The Forgotten Half: Non-College Youth in America, W. T. Grant Foundation, January, 1988.

22. Ibid.

23. Ibid.

24. Ibid.

25. Ibid.

26. Rhodes, "A Neglected Challenge."

27. "Schools Aren't Tuned in to Teens' Needs, Study Says," Quad City Times, June 19, 1989, p. 1.

28. An Equal Chance: Educating At-risk Children to Succeed, Monograph No. 4, Iowa Association of School Boards, 1989, p. 9.

29. Anastasia Toufexis, "Our Violent Kids," Time, June 12, 1989, pp. 52-58.

30. An Equal Chance, p. 9.

31. Ibid.

32. Toufexis, "Our Violent Kids," p. 53.

33. Rhodes, "A Neglected Challenge."

34. Employment Policies: Looking to the Year 2000, Published by the National Alliance for Business, February, 1986, pp. 2-3.

35. Ibid., pp. 2-3.

36. Ibid.

37. Ibid.

38. Toufexis, "Our Violent Kids," p. 52.

39. Ibid, p. 52.

40. Graham, "If Johnny Can't Read, pp. A22-A23.

41. Ibid, p. A23.

42. Bennett, "Firms Become a Crucial Agent of Social Change," p. A22.

43. Melia and Goodman, "Survival by Controlling Demographic Impacts," p. 5.

44. Ibid.

45. Ibid.

46. Hodgkinson, Higher Education, p. 9.

47. Rhodes, "A Neglected Challenge."

48. Hodgkinson, Higher Education, p. 9.

49. Ibid.

50. "For American Business, New World of Workers," p. 114.

51. Susan Tifft, "A Crisis Looms in Science," Time, September 11, 1989, p. 68.

52. Ibid.

53. Ibid.

54. Ibid.

55. Ibid.

56. Ibid.

57. Ibid.

58. Ibid.

59. Ibid.

60. Ibid.

61. Ibid., p. 70.

62. Ibid.

63. Gary S. Becker, "Why Don't We Value Schooling As Much as The Asians Do?," Business Week, December 12, 1988, p. 22.

64. Carl Sagan, "Why We Need to Understand Science," Parade Magazine, September 10, 1989, p. 6.

65. U.S. Census Bureau, School Enrollment - Social and Economic Characteristics of Students, August 13, 1985.

66. Ibid.

67. National Center for Education Statistics, The Condition of Education: A Statistical Report, 1985 (Washington, D.C.: U.S. Department of Education, 1985), Chapters 2, 3, 5.

68. Ibid.

69. Ibid.

70. Hodgkinson, All One System: Demographics of Education.

71. Hodgkinson, Guess Who Is Coming to College?, p. 14.

72. Ibid.

73. Ibid.

74. "Faculty Drain Already Saps Some Schools," p. 3.

75. Carolyn J. Mooney, "In 2003, Colleges May Need to Recruit a Third More Professors Than '89," The Chronicle of Higher Education, July 19, 1989, pp. A1 & A10.

76. Ibid.

77. Ibid.

78. Hodgkinson, "Reform? Higher Education? Don't Be Absurd!", p. 272.

79. Ibid., 274.

80. "America's Schools Still Aren't Making the Grade," Business Week, September 19, 1988, p. 132.

81. Fact Book for Academic Administrators, American Council on Education, Washington,D.C., 1982, p. 58.

82. Melia and Goodman, "Survival by Controlling Demographic Impacts," p. 11.

83. Ibid.

84. Janet Hansen, "Student Loans: Are They Overburdening a Generation," Prepared for the Joint Economic Committee of Congress by The College Board, Washington, D.C., 1986.

85. Ibid, p. 15.

86. Rhodes, "A Neglected Challenge."

87. R. Wilson, and S. E. Melendez. 4th Annual Status Report on Minorities in Higher Education. (Washington, D.C.: American Council on Education, 1985); and, National Center for Education Statistics. The Traditionally Black Institutitions of Higher Education: Their Development and Status, 1860-1982. (Washington, D.C.: U.S. Department of Education, 1985).

88. Melia and Goodman, "Survival By Controlling Demographic Impacts," p. 8.

89. Rhodes, "A Neglected Challenge," p. 8.

90. Ibid.

91. Wilson & Melendez, 4th Annual Status Report; and, National Center for Educational Statistics. The Traditionally Black Institutions.

92. Rhodes, "A Neglected Challenge."

93. "Needed Human Capital," Business Week, September 19, 1988, p. 103.

94. Rhodes, "A Neglected Challenge."

95. American Attitudes Toward Higher Education, Princeton, New Jersey: Opinion Research Corporation, 1985.

96. Bernard Wysocki and Michael J. McCarthy, "Latest New Frontier: Ex-Urban Boom Towns," The Wall Street Journal, Centennial Edition, June 23, 1989, pp. A7 and A14.

97. Ibid., p. A7.

98. Ibid., p. A7.

99. Ibid., p. A14.

100. "Life on Earth: 25% Endangered," The Des Moines Register, August 19, 1989, p. 1.

101. The Futurist, July-August 1988, p. 14; and, Dator, Jim, Pacific Century? Global Century? or No Century, speech given SCUP-23 Annual Conference "Planning in a Global Context", Society for College and University Planning, Toronto, Canada, August 1, 1988.

102. Eugene Linden, "Playing With Fire," Time, September 18, 1989, pp. 77.

103. Ibid.

104. Ibid.

105. Ibid, p. 76.

106. Ibid.

107. Ibid.

108. Ibid, p. 78.

109. "A Dubious Plan For the Amazon," Time, April 17, 1989, p. 67.

110. Ibid, p. 83-85.

111. "The Urgent Need to Recycle: Once is Not Enough," Time, special advertising section. Published by the Council for Solid Waste Solutions, (n.p.).

112. "Second Life Styrofoam," Time, May 22, 1989, p. 84.

113. "The Urgent Need to Recycle," (n.p.).

114. Ibid.

115. Ibid.

116. "Second Life Styrofoam," p. 84.

117. Ibid, p. 84.

118. "The Urgent Need to Recycle," (n.p.).

119. "Second Life Styrofoam," p. 84.

120. Ibid.

121. Ibid.

122. "Urgent Need to Recycle," (n.p.).

123. "Second-Life Styrofoam," p. 84.

124. "Directions for Iowa's Economic Future", p. 13.

125. "Ozone Defense", Time, May 15, 1989, p. 63.

126. George Church, "Smell That Fresh Air," Time, June 26, 1989, pp. 16-17.

IV.
THE CHANGING TECHNOLOGIES AND THE INFORMATION EXPLOSION

One edition of today's New York Times contains more knowledge than the average person was likely to come across in a lifetime in 17th-Century England. The number of books in libraries doubles every 14 years. -- **Robert S. Boyd, *The Des Moines Register*, July 16, 1989.**

- The amount of data collected between 1972 and 1980 equaled that collected in the previous 2,000 years.

- Between 6,000 and 7,000 scientific articles are written each day. Technical information is doubling about every 5 years. (1)

- Orrin Klapp, author of Overload and Boredom, indicates that the "size, speed, and complexity of the tidal wave of information so overwhelms some people that they tune out entirely." (2)

  The chopping of news, information, and entertainment into ever smaller slices has raised questions regarding the attention span of Americans:

  - The age of MTV 10-minute playlets
  - Flashy 15-second commercials
  - 10-second news bites
  - Talking cars and Coke machines
  - Automated "junk call" telephone dialers (3)

- Satellites collect detailed data regarding high-altitude continent-scale fronts that shape the weather, the huge ocean plankton blooms that help sustain the atmosphere, and the damage caused to the Earth's ozone shield. These orbiting sensors operate at wavelengths invisible to the human eyes, yet have uncovered ancient riverbeds beneath the Sahara Desert, mapped mineral deposits worth billions of dollars, and monitored the health of the world's crops. (4)

By the mid-1990's, much of what the U.S. learns about Earth will come from satellites of other countries. The aging U.S. satellites that provided the technology of remote sensing are falling victim to obsolescence and inadequate funding. -- **Robert Hotz, *Des Moines Register*, August 31, 1989.**

- During the the next decade, as many as 20 satellites will be launched as part of a $20 billion international effort to study the air, water, forest, minerals, ice fields, and the weather with unprecedented precision. Data obtained via these satellites will assist in diagnosing the dangers of global warming, ozone depletion, and other environmental threats.

  The international effort includes the Earth Observing System (EOS), an $8 billion project of NASA, which includes 4 unmanned platforms in polar orbits and up to 6 geostationary satellites. Other nations participating include Japan, the 11-nation European Space Agency (ESA), Brazil, Canada, and the Soviet Union.

  So far, NASA has enough money to pay only for construction of the platform for the first polar satellite. Congress has yet to authorize funds for the sensors it will carry, for a second platform, or for the network of other satellites and ground stations that will process the data. The other nations are much more ambitious in their push in satellite technology. In 1997, the Europeans will orbit their own polar EOS satellite, which will be followed by a Japanese EOS satellite in 1998, and a second U.S. EOS satellite 6 months later (if funded). Brazil and China are developing remote sensing satellites. India already has a satellite, launched in 1987, that provides data on agriculture, geology and water distribution. Japan, who has one satellite to monitor the oceans and the atmosphere, plans to launch another in 1992 to explore mineral and energy resources. Italy plans to launch a laser geodynamic satellite in 1993 to study continental drift, and in 1994, Canada hopes to have a remote sensing satellite called Radarsat to provide all-weather coverage of the Arctic. (5)

With one Earth Observing System (EOS) satellite, every 24 hours 1 trillion bits of information will be transmitted -- the equivalent of 10,000 District of Columbia telephone books. A month's worth of data will exceed the contents of the 11 million bound volumes in the Library of Congress. (6)

MACHINE-TRANSLATION SYSTEMS

- Japan's computer makers have successfully developed about a dozen machine-translation systems. These systems have linguistic ability far beyond the powers of past generations of computers: They can translate one language into another. Such systems include Toshiba's AS-TRANSAC and Fujitsu's Atlas System (SHALT).

  None of the new systems are yet able to take a page of text and render it unerringly into a different language without the aid of a bilingual editor. Machine-translation systems can nearly double the output of translators of technical documents.

  Japan has also developed machines that can translate freely among several different languages. Fujitsu's prototype Atlas-II can deal with Japanese, French, German, and English. In the near future, Spanish, Chinese, and Korean will be added. To make such systems as simple as possible, programmers have invented a coded, largely numerical language called "Interlingual". The market for such machines will be vast. (7)

BIOTECHNOLOGY

- A major step forward has been made in the engineering of animals (grafting characteristics from one organism onto another) by researchers at the University of Rome and that city's Institute of Biomedical Technology. Instead of using the conventional technique of painstakingly inserting foreign genes into an egg cell with a tiny needle, the scientists simply bathe sperm cells in a solution of bacterial DNA. The sperm, from mice, incorporated the genes by some still unknown process, then went on to fertilize eggs in a test tube. As the mice matured, 30% of them produced an enzyme normally made only by bacteria - proof that the bacterial DNA had become part of the mice's genetic makeup. Advocates of gene transplants have long pointed to the potential benefits of altered animals - disease-resistant pigs, fast-growing cows, and the like. (8)

- Research in biotechnology is emphasizing "sustainable agriculture", farming with small amounts of farm chemicals, and the development of herbicide-resistant crops. Crops that have been altered to resist the effects of herbicides can be planted; bacteria and other genetically altered microbes can be used to control crop pests. (9)

- Bioremediation is a growing technology which utilizes bacteria, fungi, and similar primitive microbes to clean up aquifers, toxic dumps, and oil spills. It is cheaper than incineration, the only other way to get rid of chemicals completely, and does not produce the toxic ash that burning does. Thus far, bioremediation has worked the best on organic compounds, such

as gasoline or pesticides, that resemble natural compounds. Now scientists are finding microbes that work on more resistant compounds. General Electric has recently discovered that bacteria in river sediments can degrade some PCB's (polychlorinated biphenyls), carcinogenic chemicals once used in electronics. (10)

Not only can microbes be used to clean up pollution, they may also be used to prevent it. A bacteria has been discovered that can metabolize sulphur; introduced into a pile of high-sulfur coal, the form that produces acid rain, the microbes might leave behind a cleaner burning fuel. Other researchers are tinkering with the genes of bacteria to produce man-made colonies that will clean up a factory's waste before it leaves the plant. (11)

LASER TECHNOLOGY

- The $20 billion spent in the 1960's Apollo program currently generates about $500 million for the American economy. Only $2 million of the $3+ billion FY90 budget of the Strategic Defense Initiative (SDI) is earmarked for promoting the transfer of technologies to the private sector. (12)

SDI researchers are concentrating on lasers, particularly the revolutionary Free Electron Laser (FEL). In addition to its potential for destroying enemy missiles, the FEL could render obsolete many current lasers. FEL is attracting a lot of attention because of its potential medical applications; Congress has earmarked an additional $17 million on top of the $2 million for SDI technical applications to explore these medical applications. The application of the Free Electron Laser to various types of surgery and screening procedures will be a major step forward in medicine. (13)

PATIENT-OUTCOMES RESEARCH

- Patient-outcomes research provides statistics on the comparative results of clinical procedures; such knowledge will enable doctors to make better decisions regarding appropriate treatments for their patients. It will also enable hospitals, clinics, health maintenance organizations, and other medical clinics to know how well various treatments work. A comprehensive national collection of data concerning patient outcomes should result in improved patient care. (14)

The next agricultural revolution will be in the use of genetic engineering to control weeds, pests, and animal diseases. (15)

LEADING-EDGE TECHNOLOGIES

Technologies and products once predicted to be developed by the year 2000 are already available. The following is a list of some of the "leading-edge" technologies now available: (16)

COMPUTER TECHNOLOGY

- A hand-held IBM-compatible PC the size of a video cassette.

- A portable computer which recognizes handwriting, and can convert it to typed text.

- "Voice", a hand-held computer which recognizes common English phrases and translates them into several languages. The machine is a portable voice processor that learns to recognize the tone and pattern of its owner's voice. The traveller speaks into the computer, which displays what it hears on a liquid-crystal display. The machine then produces a translation, either through a speaker or on its screen.

- The "Cycolor" process of producing high quality color documents which cost little more than copying.

- A 10-pound fax machine that can send and receive documents in the car and double as a personal computer, plugs into a cigarette lighter, and transmits through a car phone.

- 3-D computer chips, eight times faster than current state-of-the-art chips.

- "Quantum Structures", a new family of electronic components will lead to greater miniaturization of computers and other electronic equipment.

- Experimental "associative memory" chips: microchips that copy the way the brain's neurons process a large amount of data.

- "Bioengine" uses supercomputers to accelerate the development of new drugs, and eliminates much of the guesswork in the process. "Bioengine" makes it possible for chemists to tailor drugs on screen, and to alter their composition and shape to achieve the desired level of interaction with target compounds. It is estimated that up to 50,000 hours of experimental work could be completed in approximately one hour on a supercomputer using "bioengine".

MEDICAL TECHNOLOGY

- First generation monoclonals for use in diagnosing and treating diseases.

- Second-generation monoclonals (the result of anti-ID research), that can be used to improve vaccines, drugs, and enzymes. By the year 2000, 32 new vaccines will be introduced worldwide. Some of the new vaccines are already being marketed: genetically engineered hepatitis-B vaccine, and a vaccine to ward off meningitis in infants.

- A hand-held ultrasound scanner; it is projected that within a year, portable scanners will gain 25% of the ultrasound-scanning market.

- An ultrasound scanner that maps the structure of the skin resolves features much smaller than anything yet achieved in medical ultrasonics, and will enable doctors to examine the skin for melanomas.

- An artificial skin made out of natural polymer chitin has demonstrated excellent wound healing effects.

HOUSEHOLD PRODUCTS

- High-definition television (HDTV): with double the number of scanning lines, the HDTV picture has sharp color, improved sound, and extraordinary clarity. Though the Japanese have invested more than $300 million in ten years of research and development in a 1,125-line system, American firms are developing their own systems that can broadcast over the same terrestrial spectrum as conventional TV. HDTV could create a boom for the U.S. electronics industry. The Commerce Department estimates that world-wide sales of HDTV equipment could reach $100 billion by the year 2000.

- A microwave clothes dryer that zaps garments dry with the same energy used to reheat leftover foods.

- Remote sensing, the third most commercialized segment of the space industry after communications satellites and launch vehicles, is experiencing rapid growth.

  Remote sensing activities take satellite data and manipulate it to create products. Digital data transmitted by the satellites are processed, filtered and enhanced to provide information customers request. Such information has become a routine tool for crop surveys, forestry, urban planning, oil and gas exploration, and ocean research. Currently, all such projects are supported by their respective governments; however, the U.S. has moved the closest to commerciali-

zation by selling the rights to market the data to EOSAT, a joint venture of Hughes Aircraft and RCA. EOSAT estimates that remote sensing will be a $4 billion business by the year 2000.

- Coating techniques which result in fibers with higher resistance to chemicals and scratches, and increased durability.

- "Spectra shield" may be the strongest fiber known to man. In a ballistic test lab, the ultra high molecular weight fiber stopped bullets fired from a sub-machinegun. Applications include bullet-proof vests and military helmets, surgical gloves, helicopter seats and domeplates, underside shields for armored cars, protective clothing, brake pads, and rocket engine linings.

- Advanced structural ceramics used for cutting tools, wear parts, automotive/heat engine parts, bioceramics, and aerospace and defense applications. The market is expected to grow from $171 million in 1987 to $433 million in 1990, $1.2 billion by 1995, and to $2.6 billion by 2000.

- Toxic fumes detector: in less than 3 minutes, it can detect and identify 40 common industrial gases in its computerized library. The detector can be used by firefighters, industrial hygienists, petroleum and chemical workers, and others whose jobs hold the risk of encountering hazardous gases.

- Superbugs: the application of microbes to break down highly toxic substances into harmless byproducts.

LEADING TECHNOLOGIES "IN THE WORKS"

- "Telecomputers" could make the Japanese High Definition Television (HDTV) obsolete. These new television/computers -- telecomputers -- will provide the programs digitally, through an expanding network of mostly fiber-optic cables.

- Researchers at General Motors are working on designing vehicles that can literally sense how a driver behaves at the wheel in terms of response times, precision of control, and possibly physiological data. These electronic controls will use the information to optimize the vehicle for the operator under a wide range of driving conditions.

- With the space shuttle program resumed, the Electronics Industry Association forecasts that the U.S. will spend $14 billion between 1989 and 1995 on the electronics content of space launch systems alone. The space shuttle itself will produce a $5.6 billion market.

EMERGING TECHNOLOGIES ADAPTED TO THE CHANGING DEMOGRAPHICS

The emerging demographic trends, aided by new breakthroughs in technology, will challenge companies to come up with new products and services that are both useful and attractive to an older, more ethnic society. These new products and services will probably include: (17)

- A new type of automobile specifically for older drivers. It will feature special electronic systems with indicators that alert the driver if he/she is going too fast or if he/she is too close to another car.

- Appliances designed for older people, such as washing machines and driers that have doors and openings at waist level, will be commonplace. Appliances with large letters and big knobs are already starting to appear on the market.

- Computer memory chip technology changing the nature of home health care. America's aging affluent population will own cholesterol machines and self-monitoring systems, perhaps even a $99 home CAT scanner, which will plug into a television set.

- Increased demand for medication.

- A large market for elderly housing.

- Products that reflect home-country tastes, such as clothing, home furnishings and interior decorations with specific ethnic appeal.

- "Convenience" refined by the food business. Microwave ovens will be standard features in automobiles. Drive-in grocery stores will be commonplace. Ready-to-eat products will instantly heat or cool when a plastic strip across the top is removed.

- Service-related industries such as ride services and errand runners for the elderly.

- An increase in products and services that reinforce the virtues of youth and immortality, such as cosmetic surgery.

- Increased popularity of luxury frontier-style travel -- major tour companies will develop adventuresome trips for an active older population.

- Affordable interactive home electronics products that will allow travellers to choose destinations and make plane and hotel arrangements via their TV sets.

- A flourishing trade in funeral homes as well as related businesses such as florists.

National

- Telecommunications will enable school districts to offer diversity of classes accessible to large numbers of students, both children and adults. Crippled by limited staffs and tight budgets, rural districts have often found it impossible to offer such classes as Russian, Japanese, German, Physics, and the advanced Math classes; the electronic classroom can solve the problem, for it enables instructors and students to hear and interact with one another.

  The tele-classroom has been especially valuable in states with small populations and struggling economies. Most students seem pleased with the long distance learning, and in many respects, TV classrooms are comparable to traditional ones. (18)

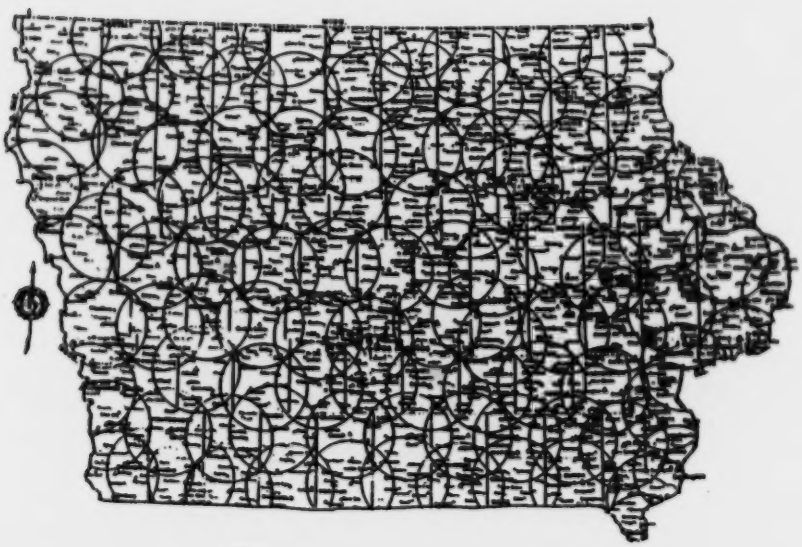
Iowa

- The Iowa State Legislature funded the development of a state-wide plan for telecommunications which would link all areas of the state. The plan has been approved, and includes three components:

  1. Development of the backbone system.
  2. The Telelinks.
  3. Instructional Television Fixed Service (ITFS).(19)

Figure 28

IOWA STATE-WIDE TELECOMMUNICATIONS SYSTEM



Taken from: Iowa Educational Telecommunications Plan.

- The Iowa state-wide telecommunications system will have as its major mission the providing of teaching capability through telecommunications that can be configured on a local, regional, state-wide, national, or international basis to meet the educational needs of the state.

  Some application areas include:

  1. sharing educational capabilities among K-12 districts to equalize educational opportunities among large and small districts.

  2. serving areas not currently served by a post-secondary institution within reasonably close proximity.

  3. providing professional upgrade coursework within the community where the practitioner lives.

  4. providing special targeted courses to areas of the state where the need for such is present.

By using interactive video, even small, disadvantaged schools are regaining access to the the most sophisticated instruction available, and all without losing the human touch. -- ***Time*, May 22, 1989.**

IV. THE CHANGING TECHNOLOGIES AND THE INFORMATION EXPLOSION

1. Dale Parnell, The Neglected Majority, p. 13.

2. Robert S. Boyd, "The Information Overload," The Des Moines Register, July 16, 1989, p. 3E.

3. Ibid.

4. Robert Lee Hotz, "'Mission to Earth': Global Space Fleet to Explore Weather, Air, Sea and Land," The Des Moines Register, August 31, 1989, pp. 1T and 12T.

5. Ibid.

6. Ibid.

7. "Trying to Decipher Babel," Time, July 24, 1989, p. 62.

8. "Gene-Splicing Revolution," Time, June 12, 1989, p. 59.

9. Dan Looker, "Groups Urge Sharing of Biotechnology," The Des Moines Register, May 25, 1989, p. 7S.

10. "Microbes to the Rescue!", Newsweek, June 19, 1989, p. 56-57.

11. Ibid.

12. John Rhey, "SDI's Technology Dividends", Defense World, June-July, 1989, p. 10-11.

13. Ibid.

14. Melissa Ludtke, "Physician, Inform Thyself," Time, June 26, 1989, p. 79.

15. Looker, "Groups Urge Sharing," p. 7S.

16. Patricia Roe, Leading Edge Technologies, The $(IC)^2$ Institute, The University of Texas at Austin, Fall; 1988, 46 pages; Spring, 1989, 35 pages; and Winter, 1989, 36 pages.

17. Thomas R. King, "Catering to the Maturing Baby Boom Generation", The Wall Street Journal, Centennial Edition, June 23, 1989, p. A7.

18. "Beam Me Up Students," Time, May 22, 1989, p. 107.

19. Larry G. Patten, Iowa Educational Telecommunications Plan, Presented to the Education Uplink Committee of the 72nd General Assembly of the State of Iowa.

V.
THE WORLD ECONOMY

- In 1969, U.S. manufacturers produced 82% of the nation's television sets, 88% of its cars, and 90% of machine tools. Today U.S. manufacturers make hardly any TV sets, and have lost half the domestic machine-tool market and 30% of the auto market. (1)

- The U.S. world market share in semiconductors shrank from 85% in 1980 to 15% in 1989. (2)

- Manufacturing will continue to comprise about 20% of the total U.S. output -- but much of that will be done in foreign-owned plants in America. (3)

- When Reagan took office, the U.S. was the world's leading creditor nation. By his second term, the U.S. had become the leading debtor nation. It is anticipated that by 1992, the national debt of the U.S. will be greater than that of all of the rest of the world combined. The U.S., who with Canada was once the breadbasket of the world, became during the same period a net importer of food; the U.S. imports substantially more food than it exports. (4)

- Britain is the biggest foreign investor in the United States, as it has been since colonial days. Though the Japanese are getting the headlines, British companies have been aggressive, entrepreneurial, and international. In 1989:

    - Grand Metropolitan PLC bought Pillsbury Company for $5.8 billion, giving it Green Giant, Haagen-Dazs, and Burger King.

    - In August, Bass PLC agreed to buy Holiday Inns Inc. for $2.2 billion.

    - On September 3, Polly Peck PLC agreed to pay $875 million for the fresh food operations of RJR Nabisco's Del Monte Foods Inc. (5)

The rise of Japan, South Korea, Taiwan, Hong Kong, and Singapore surely ranks among the most significant economic events of the past 30 years. one crucial factor is that these countries pay much closer attention than the U.S. does to education, training, work habits, and other ways of boosting workers' skills . . . Schools in Japan and other successful Asian countries emphasize mathematical and other technical skills demanded by modern industry, agriculture, and many service businesses . . . on-the-job training seems (to be) . . . much more important in the Asian countries than in America. -- **Gary S. Becker, Professor of Economics and Sociology, University of Chicago. (6)**

- While Japanese investment is concentrated in heavy industry and high tech, British investment is across the board. Examples:

    - British Petroleum Company owns Standard Oil.

    - Robert Maxwell owns Macmillan Books.

    - Hansen PLC owns Smith-Corona Typewriters.

    - BAT Industries owns Farmers Group Insurance. (7)

- U.S. manufacturers are at a disadvantage because they lack the government backing for research, development, and training that Japanese and European companies receive. (8)

THE U.S. SHARE OF THE WORLD ECONOMY WILL FALL FURTHER BY 2000

- The annual growth rate of the U.S. economy has not kept up with the world's economic growth rate. Between 1960 and 1985, the U.S. growth rate averaged 3.1% annually, compared to 3.9% for the world economy.

- The U.S. share of the world economy dropped from 35% in 1960, to 28% in 1985.

- World Population forecasts that there will be a massive increase in the labor force, leading to intensive international competition for jobs. This competition will be between the Less Developed Countries (LDCs) and the More Developed Countries (MDCs). The LDCs will have a decided labor-cost advantage, and many jobs requiring relatively unskilled workers will go overseas and will no longer be available in the United States. (9)

- The growth in the developing countries will continue its rapid pace, fueled by large gains in their labor force, the continuing shift from subsistence agriculture to manufacturing, and rising educational levels.

- Moderate productivity gains and slow labor growth in the service-dominated U.S. economy will make it increasingly difficult for the U.S. to match world economic growth rates.

The U.S. prosperity between now and 2000 depends primarily on how fast the world economy grows and how rapidly domestic productivity increases, especially the productivity in the service industries.

- By December 31, 1992, 12 members of the European Community (EC) have pledged to unite their markets, creating the world's largest market and trading bloc. The European Community consists of: Belgium, Britain, Denmark, France, Greece, Ireland, Italy, Luxemborg, The Netherlands, Portugal, Spain, and West Germany.

- Austria and Norway are considering joining, as well as neutral Switzerland. (10)

Figure 29

- The European Community will be a market of more than 320 million people, compared with 220 million in the United States and 120 million in Japan. It will give European industry an opportunity to organize on a scale large enough to compete with its main rivals in Japan and in the United States. (11)

The development of the European Community "*points to two major trends affecting the world economy. One is that deregulation has become a powerful international force, exerting a positive influence on the economies of nations and contiguous geographical areas. The other is that North America, Japan, and now Europe are emerging as major trading powers that can either threaten outsiders or become new engines of growth for all.* (12)

Table 11

European Community
Selected Economic Data

	GDP*	Unemployment	Inflation
Belgium	$139	12.3%	1.6%
Denmark	$101	7.6%	4.1%
France	$880	10.9%	3.2%
Greece	$47	7.4%	14.0%
Ireland	$29	19.2%	3.0%
Italy	$752	14.2%	4.8%
Luxembourg	$6	1.6%	0.6%
Netherlands	$215	11.5%	0.0%
Portugal	$36	7.2%	10.2%
Spain	$288	20.5%	5.3%
United Kingdom	$663	10.8%	3.3%
West Germany	$1,119	8.1%	0.6%

* Gross Domestic Product (GDP) in billions of 1987 dollars and 1987 exchange rates. All data are 1987.
Newsweek, October 31, 1988.

- Project 1992 includes 300 measures that will eliminate customs barriers, create European passports and drivers' licenses, and standardize rules for thousands of goods shipped to the 12 nations. Sales tax differences will be eliminated, and professionals, such as doctors, accountants, and lawyers, will be able to practice in any member country. Long term goals include a single currency and European-chartered corporations and labor unions. (13)

- European unemployment could rise to 15% as it sheds inefficient enterprises (14) and this could be politically explosive. (15)

- 1992 will open up government procurement in all E.C. countries for European and non-European companies alike.

- As 1992 approaches, there is fear that Western Europe will enact protectionist policies. (16)

- Two key measures of Project 1992 that are likely to have long delays in their resolution are unified taxes and common currency. There are likely to be long delays in the resolution of these issues beyond 1992. (17)

- "Euroentrepreneurs" are emerging, streamlining the continent's industries and forging an European invasion of corporate America. In 1987, Europeans spent $37.1 billion acquiring American companies, while Americans spent $2.4 billion acquiring European companies. (18) In 1988, British raiders spent $32 billion on U.S. companies, compared with $12.7 billion by the Japanese. (19)

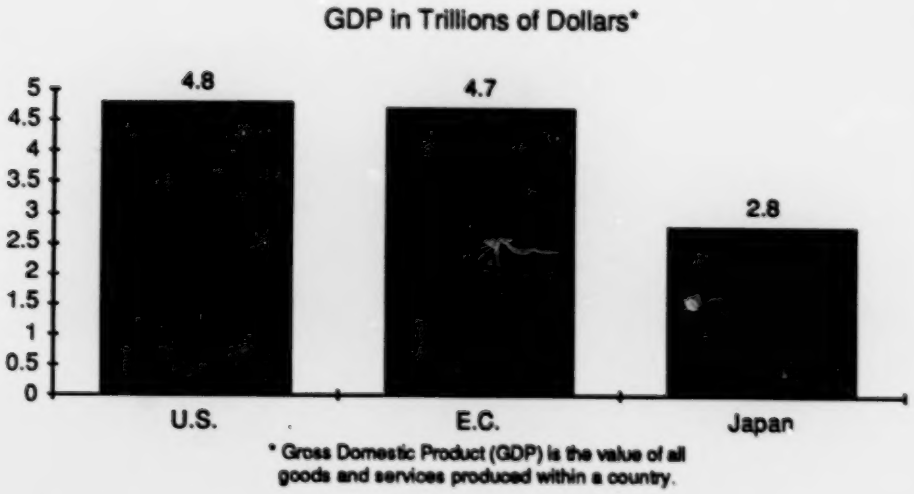
- Boeing's main competitor in the lucrative commercial aviation sector is Airbus Industrie. (20)

- The U.S. Space Shuttle program is challenged by Western Europe's Arianespace, the commercial arm of the 13-European Space Agency. Arianespace has completed 33 launches and has $2.1 billion worth of contracts. (21)

- The European Center for Particle Physics in Switzerland has completed construction of the world's most powerful particle accelerator, and is funded by 14 European countries. It is poised to outdistance the U.S. in the field of high-energy physics. (22)

- Europe has a history of supplying government assistance to troubled industries: they are helping Airbus ward off Boeing, and are funding a new semiconductor consortium JESSI to help European companies compete against U.S. and Japanese chipmakers. European computer makers ranging from Bull to ICL to Siemens are also likely to receive government help to counter successful U.S. rivals. (23)

Figure 30



Taken from: Time Magazine, September 18, 1989, p. 40.

If Project 1992 succeeds, an economic superpower will be created. In 1988, the European community's output was worth $4.7 trillion, almost equal to that of the U.S., and greater than the combined output of Japan, Hong Kong, Singapore, South Korea, and Taiwan. A unified European community will account for 37% of the world's commerce, and with over 327 million consumers will become the largest market in the industrial world. (24)

RISING STARS IN WORLD MARKET

Where are the new economic stars likely to emerge over the next few decades? Where will the South Koreas, Singapores, Hong Kongs, and Taiwans of tomorrow be? For their Centennial Edition, The Wall Street Journal Editors called upon the experts to help them identify those developing countries that could take off economically, attract world class capital, and become the rising stars of the world marketplace.

The factors that seem to contribute to such economic takeoff are:

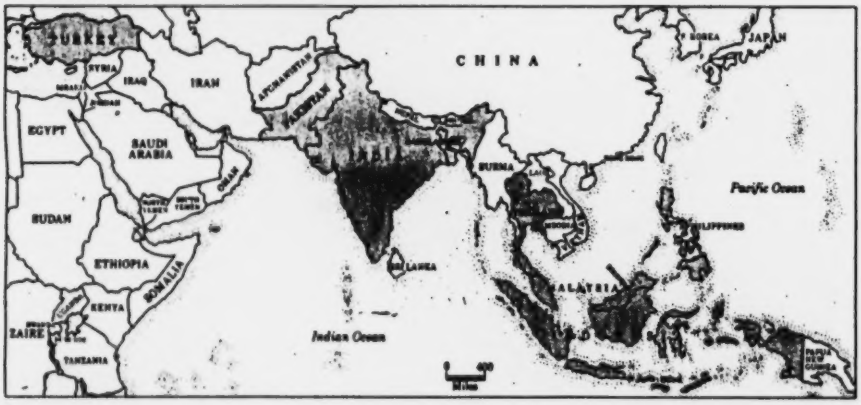
- Political stability
- A pro-business climate, with open capital markets and a relatively free private sector
- High-quality, low-cost labor
- A healthy economic demand at home
- An export-oriented economy, preferably with manufactured exports rather than raw materials

CONCENSUS:

- Everyone agreed that attention should be on Southeast Asia -- especially Thailand and Malaysia.
- The Philippines and Indonesia are rather far behind. After these, there is no agreement.
- It's "iffy" whether Brazil, Turkey, India and China can take off. Even with Gorbachev's good intentions, the Soviet Union is hopeless; and Africa is worse than hopeless.
- Mexico, which seems to be doing the right things, may be the dark horse who surprises us all.
- Factors which can alter these predictions and the requirements for boosting a country's economic vitality include: war, revolution, disease, family, depression, advances in technology and science, and the dilution or collapse of Soviet or Chinese communism.

Those countries most experts say we should watch are described in the following pages. (25)

Figure 31



THE PACIFIC & ASIA

Thailand	Number One on everyone's list. Strong, well-proportioned and well-controlled. Seems to have all the necessary conditions for an economic takeoff.
Malaysia	Number Two on most people's "most promising" list, but has a more complex social and political mix. Rich in commodities; has the highest level of personal income among the Asian prospects. Export-oriented manufacturing is becoming its most active economic sector.
Philippines & Indonesia	Long shot. Good economic indicators but their biggest problems are political.
India	Very dark horse. Tremendous potential but economy is very closed and burdened by controls.
Bangladesh	Has an outside chance. Has large labor force, most of which are Bengalies, who value work and education. Immense problems -- only 4 countries have lower per-capital Gross National Product in the World Bank's latest rankings.

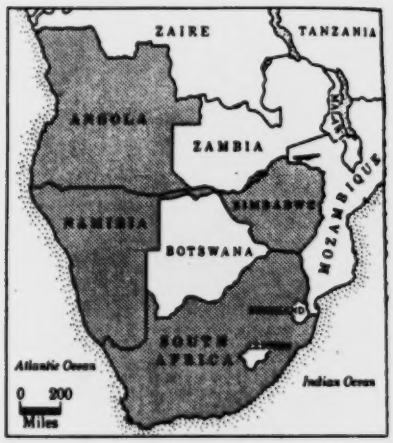
The Twenty-first Century may be the Pacific Century. -- **Japan's Nomura Research Institute.**

Pakistan — Ultra-long shot due to troubled political and social mess, compounding other problems.

Turkey — Ultra-long shot.
Has characteristics for economic success, but needs to fit them together.

AFRICA — It is so poor that many economists say that "Africa is gone".

Figure 32



AFRICA

Zimbabwe — Probably has the best chance of any African nation.
Growth has slowed markedly since the years immediately following its independence in 1980.
Fairly well-developed manufacturing sector.

South Africa — Could become a world class economic power if it could eliminate apartheid and reform its political system without destroying its economy.

Angola — Could be.
Has vast mineral and oil wealth, which could attract investors. Recent settlement of its border war with South Africa. Needs to maintain a stable government.

Namibia — Same as Angola.

Figure 33

LATIN AMERICA Most of Latin America can be written off until the debt crisis is resolved.

Mexico If you could eliminate its debt, it could be a winner.
Has a big market and borders the world's wealthiest market. New president is trying to eliminate corruption. Developing a strong free private sector.

Brazil Large, rich, and inherently dynamic.
Tremendous debt burden.
So stymied economically, politically and socially, may not make it.

Chile Asian and Pacific companies already have begun setting up there.
Needs to work its way through the post-Pinochet political transition.
Some think it could become the Switzerland of Latin America.

Colombia Has a strong economy.
But, home to the Medellin cartel -- the dominant force in the world's cocaine trade.

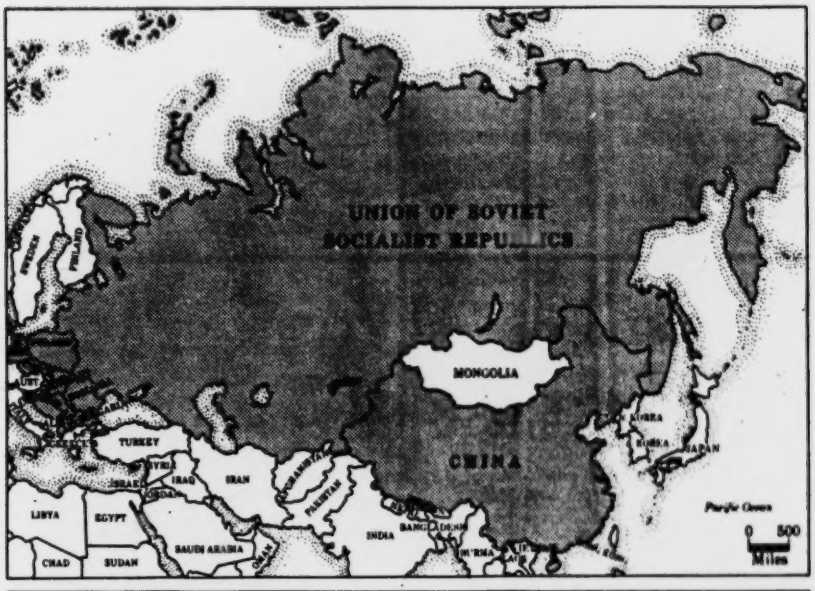
CENTRAL AMERICA "No peace, no prosperity."

COMMUNIST COUNTIRES

Their problem is political.
The communist dilemma is described by some Westerners as, "You can't grow without opening the markets, you can't open the markets without losing control, and you can't LOSE CONTROL."

COMMUNIST COUNTRIES

Figure 34



COMMUNIST COUNTRIES

China

Current upheaval makes it unpredictable.
The world's biggest market, but the market needs immense economic and political reform.
Has an entrepreneurial tradition.

USSR

Though Gorbachev is trying, it won't go anywhere soon.
Resistance to change is too strong.
The country lacks a business culture.

Eastern Europe	Unlikely that Eastern Europe would take off economically apart from the Soviet Union. Yugoslavia, Poland, and Hungary are wooing Western investment. Hungary is encouraging Americans and Japanese to establish bases there to work their way into the European Community after 1992.
Cuba	Should change after Castro. 90 miles from the richest export market in the world. Will attempt to woo the Cuban exile community in the U.S.
The Caribbean	Could happen to a few islands, but they're very small.

IOWA'S ECONOMIC DEVELOPMENT REPORT CARD

IOWA'S RANKING AGAINST 50 U.S. States

Financial Capital

- 8th in bank deposits per 1,000 population
- 50th in loans-to-equity ratio
- 47th in commercial and industrial loans per 1,000 workers
- 29th in venture capital
- 9th in dividend, rent, and interest income per capita

Business Climate

- 42nd in taxes
- 25th in state business incentives
- 39th in labor costs
- 26th in available workforce
- 5th in education
- 10th in health care
- 5th in transportation
- 22nd in state economic development spending

Technology

- 31st in scientists and engineers per 1,000 workers
- 9th in science and engineering Ph.D. students per 1,000 population
- 14th in university R&D per capita
- 34th in federal R&D per capita
- 25th in patents issued per 100,000 population

Entrepreneurship

- 48th in number of new companies per 10,000 workers
- 43rd in percentage of fast-growing companies
- 40th in nonmetropolitan new enterprise job growth
- 41st in metropolitan new enterprise job growth
- 14th in minority and women business ownership

This summary of Iowa's rankings is taken from data presented in: Iowa's Future: A Quality Economy for Tomorrow, Published by The Future Project, Sponsored by Iowa Newspaper Association, 1989, p. 13.

- In 1988, Iowa ranked 10th in total value of export shipments.

- In 1988, Iowa replaced Illinois as second in the nation in farm exports. California moved to the top in 1985, and has been Number One ever since. California's exports totalled $3.39 billion, while Iowa's totalled $3.15 billion. (26)

- Iowa currently leads the nation in the export of: (27)

  - Soybeans and soybean products $1.25 billion
  - Feed grains $1.1 billion
  - Feeds and fodders $89 million

- Iowa has open port warehousing which enables companies to move goods into an Iowa warehouse, divide them, repackage them, and label them all without paying any property tax as long as the goods are destined for a final destination or delivery outside Iowa. This is a tremendous advantage to a distributor, for instance, of consumer goods who ships to major geographic areas in bulk, or breaks shipments into smaller units for delivery into more limited market areas. (28)

- Iowa's economic outlook for the next 3-5 years is positive. The latest official Iowa economic forecast (June 1989) predicts a growth rate of between 5 and 7% over the next several years. Fundamental forces in the economy should continue to be favorable:

  - The Gross National Product is expected to grow, but slowly.
  - Inflation and interest rates are forecast to remain at about the levels they are today.
  - The U.S. dollar is expected to remain weak against other major currencies, perhaps declining another 15% from its current level.
  - Petroleum, among other energy prices, may be volatile but should not rise dramatically.
  - Exports should continue to grow and the U.S. merchandise trade deficit should continue to shrink, although slowly. (29)

- Concerns regarding Iowa's short-term economic outlook are in terms of drought, federal agricultural policies and programs, and tensions surrounding international trade, especially with Europe and Japan. However, the majority of signs point toward continuing recovery and moderate expansion of Iowa's economy. (30)

- The current national tendency to reduce consumption of red meat places stress on the livestock farmers and meatpacking industries at a time when they are facing modernization, ownership realignment, and depressed exports. (31)

- Iowa's long-term economic expansion requires that Iowa concentrate its efforts on diversifying and expanding its economy by encouraging the development of activities which are less cyclical, volatile, and have good growth potential. Another consideration in Iowa's recovery and growth is the American dollar against international currencies. (32)

- Iowa's employment mix will continue to shift away from natural-resource and goods-related activities (farming and manufacturing) toward information-based activities. The trend towards consolidation of farming units will continue, for both economic and demographic reasons. (33)

- Export activity and foreign investment in Iowa will continue to increase. The integration of Iowa firms and institutions into the global economy will also continue. (34)

- Telecommunications and fiber optics are being heralded as the "new road for future economic development. . . . Communities linked to fiber-optic networks are transformed into entities that can compete globally. . . . . Technology like this, with all of its discoveries and yet to be discovered applications, will need to be adopted in Iowa in order to compete effectively on a global basis." (35)

- In Iowa, the insurance industry has grown steadily and flourished. In 1986, the report of the Insurance Division of Iowa listed a total of 1,510 insurers that were operating in Iowa. Of these firms, 251 have their headquarters in the state. Employment in the insurance industry increased by 27% from 1979 to 1988. The insurance industry is expected to continue growing at a pace greater than average for all industries. (36)

- Iowa's central location and diversified transportation system provides convenient access to all parts of the U.S. Because of the increasing use of telephone and data processing communication systems, Iowa's central location provides businesses with more time to conduct business with the East and West time zones. (37)

- Iowa is bordered by two navigable rivers. Goods can go by water as far east as Pennsylvania, west to Oklahoma, and to seaports on the Gulf and the Great Lakes. Water transportation is of prime importance in international trade. In 1984, nearly 43 million tons of cargo on the Mississippi passed through the Davenport area. (38)

- The great demand for farm and construction mechanization encouraged large-scale manufacturing in Iowa, including large-scale food processing, transportation, and utilities. This, in turn, resulted in smaller scale supporting industries being developed. Diversification of industry in Iowa has continued to grow in the areas of home appliance manufacturing, electronics, telecommunications, plant food, chemicals, warehouse and distribution. (39)

- 119 of the Fortune 500 companies operate plants in Iowa, taking advantage of Iowa's favorable business climate and stable, productive workforce. (40)

- Compared to the average American production worker, Iowans are 22% more productive. They have put in the equivalent of 63.4 weeks a year, or 48.8 hours a week when compared with the national average. This means the typical Iowa manufacturing worker produces $17,170 more value per year than the average counterpart throughout the American people. (41)

The planning process used to develop the Five-Year Economic Development Plan for Iowa indicates that in order to improve our future standard of living, Iowa must adopt and implement the following strategies.(42)

1. Invest in our human capital so that our greatest resource -- our people -- may be employed as productively as possible.

2. Keep pace with rapidly changing technology and exploit economic opportunities associated with emerging technologies.

3. Step up efforts to diversify our economy and our individual companies and farms -- to make our economy more stable, less volatile, and less narrowly specialized.

4. Create and maintain a more competitively stable environment for new business development and business growth.

5. Encourage the availability of financial capital needed for new development and business growth.

6. Invest in and maintain critical infrastructure, both physical and social, needed to support the economy.

7. Develop and maintain vital, liveable communities and encourage groups of communities to work together and to share resources.

8. Build a positive internal and external image for Iowa.

9. Protect the quality of our natural resource base and environment, even while growing and developing.

Iowa has before it a "window of opportunity" – a period of perhaps 5 years in which it can choose to initiate or not initiate some fundamental changes in its economy and institutions to encourage growth and change. The roller coaster experiences of the period between 1970 and 1988 suggest that Iowa cannot afford to become complacent and simply ride along with the current recovery... Iowa needs to concentrate on building a future economy which can deliver a higher standard of living for Iowans and is less volatile, more resilient, and less prone to disruption by outside forces. (43)

V. THE WORLD ECONOMY

1. Timothy D. Schellhardt and Carol Hymowitz, "U.S. Revival Depends on Break From Old Ways," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A22.

2. Ibid.

3. Ibid.

4. Dator, Pacific Century? Global Century? or No Century? 5. "The British Are Coming on Strong," Quad City Times, September 10, 1989, p. 1E.

6. Becker, "Why Don't We Value Schooling," p. 22.

7. "The British Are Coming," Quad City Times, p. 1E.

8. Schellhardt, "U.S. Revival Depends on Break From Old Ways," p. A22.

9. "Work in the Twenty-first Century," Futures, December, 1986, pp. 827-28.

10. Stone, "The Globalization of Europe," p. 92.

11. Ibid.

12. "The New Europe? Yes. Fortress Europe? No.", Business Week, December 12, 1988, p. 136.

13. Scott Sullivan, "Who's Afraid of 1992?", Newsweek, October 31, 1988, pp. 32-34.

14. Christopher Redman, "Charging Ahead," Time, September 18, 1989, p. 42.

15. "Reshaping Europe: 1992 and Beyond," Business Week, December 12, 1988, pp. 48-51.

16. Stone, "The Globalization of Europe," p. 92.

17. "Reshaping Europe," p. 50.

18. "Will the New Europe Cut U.S. Giants Down to Size?", Business Week, December 12, 1988, p. 54.

19. Redman, "Charging Ahead," p. 42.

20. Ibid.

21. Ibid.

22. Ibid.

23. "Will the New Europe Cut U.S. Giants," p. 55.

24. Redman, "Charging Ahead," p. 42.

25. "Thailand, Malaysia Set for Economic Takeoff," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A8.

26. "Iowa's Crop Exports Leap Past Illinois," Quad City Times, June 18, 1989, p. 1E.

27. Ibid.

28. 1987 Statistical Profile of Iowa, Iowa Department of Economic Development, p. 53.

29. "Directions for Iowa's Economic Future", p. 5.

30. Ibid.

31. Labor Market Information for Iowa, Iowa Department of Employment Services, June 1989, p. 108.

32. "Directions for Iowa's Economic Future," p. 5.

33. "Directions for Iowa's Economic Future", p. 13.

34. Ibid.

35. "Directions for Iowa's Economic Future", p. 15.

36. "L.M.I. Focus: Insurance -- A Thriving Iowa Business," Iowa Employment Review, March, 1989, p. 2.

37. Labor Market Information for Iowa, Iowa Department of Employment Services, June 1989.

38. Ibid.

39. Ibid.

40. "The 500 Largest U.S. Industrial Corporations," Fortune, April 28, 1986.

41. 1987 Statistical Profile of Iowa, p. 51.

42. "Directions for Iowa's Economic Future," The Five-Year Economic Development Plan, 1989 Update, p. 2.

43. Ibid, p. 5.

"The 500 Largest U.S. Industrial Corporations." Fortune. April 28, 1986.

1987 Statistical Profile of Iowa. Iowa Department of Economic Development. Des Moines, Iowa, 111 pages.

American Attitudes Toward Higher Education. Princeton, New Jersey: Opinion Research Corporation. 1985.

"America's Schools Still Aren't Making the Grade." Business Week. September 19, 1988, pp. 129-136.

American Society for Training and Development, Workplace Basics. 1989.

Anthan, George. "After a Decade-Long Slide, Farm Population Steadies." The Des Moines Register. September 13, 1989, p. 1.

"Baby Rate Bounces Upward." Quad-City Times. June 23, 1989, p. 44.

"Beam Me Up Students." Time. May 22, 1989, p. 107.

Becker, Gary S. "Why Don't We Value Schooling As Much as The Asians Do?" Business Week. December 12, 1988, p. 22.

Bennett, Amanda. "Firms Become a Crucial Agent of Social Change." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A22.

"Bonus for Having Babies." The Des Moines Register. September 12, 1989, p. 10T.

Boyd, Robert S. "The Information Overload." The Des Moines Register. July 16, 1989, p. 3E.

Brannigan, Martha. "Help Wanted: The Shortage of Youths Brings Wide Changes to the Labor Market." The Wall Street Journal. September 2, 1986, pp. 1+.

"The British Are Coming on Strong." Quad City Times. September 10, 1989, p. 1E.

Cage, Mary Crystal. "High-School Graduates: Some States Face Sharp Drop; Others, Big Growth." The Chronicle of Higher Education. March 1, 1989, pp. A1 & A18.

Castro, Janet. "Where Did The Gung-Ho Go?" Time. September 11, 1989, pp. 52-56.

The Chronicle of Higher Education Almanac. September 6, 1989, p. 46.

Church, George. "Smell That Fresh Air." Time. June 26, 1989, pp. 16-17.

Corbella, Lisa. "Drastic Changes Urged in Training Canada's Workers," The Toronto Star, June 12, 1989, p. A8.

Dane, Michelle. "Nursing Numbers Need Nursing Back to Health." The Leader. May 18, 1988. p. A4.

Dator, Jim. Pacific Century? Global Century? or No Century. Speech given at SCUP-23 Annual Conference "Planning in a Global Context", Society for College and University Planning. Toronto, Canada. August 1, 1988.

"Directions for Iowa's Economic Future." The Five-Year Economic Development Plan, 1989 Update. June 1989 Draft Report. Iowa Area Development Group (first draft of the five-year strategic plan for Iowa).

"A Dubious Plan For the Amazon." Time. April 17, 1989, p. 67.

Dunn, William. "Mini-boom: Births at 25-year High." USA Today. June 22, 1989, p. 1.

Employment Policies: Looking to the Year 2000. Published by the National Alliance for Business. February 1986, pp. 2-3.

An Equal Chance: Educating At-risk Children to Succeed. Monograph No. 4. Iowa Association of School Boards. 1989, p. 44.

Fact Book for Academia Administrators. American Council on Education. Washington DC, 1982.

"Faculty Drain Already Saps Some Schools." USA Today. July 24, 1989, p. 3.

"Family Support for Workers." The Futurist. March/April 1988, p. 51.

Felton, Geraldene. "Creating a New Category of Worker Won't Solve the Crisis in Nursing." The Chronicle of Higher Education. March 8, 1989, pp. B2-B3.

"For American Business, A New World of Workers." Business Week. September 19, 1988. pp. 112-120.

The Forgotten Half: Non-College Youth in America. W. T. Grant Foundation. January, 1988.

Fullerton, Howard N., Jr. "Projections 2000: The Labor Force Projections 1986 to 2000." Monthly Labor Review. September. 1987, pp. 19-29.

The Futurist, July-August, 1988, p. 14.

"Gene-Splicing Revolution," Time, June 12, 1989, p. 59.

Goudy, Willis. Iowa Census -- Population Projections for Selected Age Groups in Iowa Counties: 1990-2010. Iowa State University. September 1988.

Goudy, Willis. Presentation to the Iowa Legislative Higher Education Task Force. Spring 1989.

Graham, Ellen. "If Johnny Can't Read, the U.S. Can't Compete." The Wall Street Journal, Centennial Edition. June 23, 1989, pp. A22-A23.

Hansen, Janet. "Student Loans: Are They Overburdening a Generation." Prepared for the Joint Economic Committee by Congress by The College Board. Washington, DC, 1986.

Hodgkinson, H. L. All One System: Demographics of Education, Kindergarten Through Graduate School." Washington, DC: Institute for Educational Leadership, Inc., 1985.

Hodgkinson, H. L. Guess Who's Coming to College? Your Students in 1990. Washington, DC: National Institute of Independent Colleges and Universities. 1983, 18 pages.

Hodgkinson, Harold L. Higher Education: Diversity is Our Middle Name. Washington, DC: National Institute of Independent Colleges and Universities. 1986, 16 pages.

Hodgkinson, Harold L. "Reform? Higher Education? Don't Be Absurd!" Phi Delta Kappan. December 1986, pp. 271-274.

Hotz, Robert Lee. "'Mission to Earth': Global Space Fleet to Explore Weather, Air, Sea and Land," The Des Moines Register. August 31, 1989, pp. 1T and 12T.

Hubert, Cynthia. "Nursing Shortage Turning Critical: Turnover Rate High." The Des Moines Sunday Register. May 1, 1988. pp. 1-B and 6-B.

Iowa Directory of Exporters, 1988-89. Iowa Department of Economic Development. Des Moines, Iowa. 1989.

Iowa's Future: A Quality Economy for Tomorrow. Published by The Future Project. Sponsored by Iowa Newspaper Association. 1989, 16 pages.

"Iowa's Crop Exports Leap Past Illinois." Quad City Times. June 18, 1989, p. 1E.

Johnston, William B. and Arnold H. Packer. Workforce 2000. Hudson Institute: Indianapolis. 1987, 117 pages.

Kanamine, Linda. "20 Million More Jobs by 2000." USA Today. June 24, 1988, p. B1.

Kantrowitz, Barbara. "A Mother's Choice." Newsweek. March 31, 1986, pp. 46-51.

Kantrowitz, Barbara. et al. "Changes in the Workplace." Newsweek. March 31, 1986, p. 57.

King, Thomas R. "Catering to the Maturing Baby-Boom Generation." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A7.

Kutscher, Ronald E. "Projections 2000: Overview and Implications of the Projections to 2000." Monthly Labor Review. September 1987, pp. 3-9.

"L.M.I. Focus: Insurance -- A Thriving Iowa Business." Iowa Employment Review. March 1989, p. 2.

Labor Market Information for Iowa. Iowa Department of Employment Services. June 1989, 108 pages.

"Life on Earth: 25% Endangered." The Des Moines Register. August 19, 1989, p. 1.

Linden, Eugene. "Playing With Fire." Time. September 18, 1989, pp. 76-85.

Looker, Dan. "Groups Urge Sharing of Biotechnology." The Des Moines Register. May 25, 1989, p. 7S.

Ludtke, Melissa. "Physician, Inform Thyself." Time. June 26, 1989, p. 79.

Ludwig, Meredith, and Gail Latouf. "Public, Four-Year Colleges and Universities: A Health Enrollment Environment." Washington, DC: American Association of State Colleges and Universities, and the National Association of State Universities and Land-Grant Colleges. 1986, 46 pages.

Melia, Patricia K., and Marshall R. Goodman. "Survival by Controlling Demographic Impacts, or It's Better to Know Now Than Regret Later." Paper presented at the American Association of University Administrators Annual Meeting, Toronto, Canada. June 29-July 2, 1987, 26 pages.

"Microbes to the Rescue!" Newsweek. June 19, 1989, p. 56-57.

Mooney, Carolyn J. "In 2003, Colleges May Need to Recruit a Third More Professors Than '89." The Chronicle of Higher Education. July 19, 1989, pp. A1 & A10.

"More Women Mean Business." USA Today. June 21, 1989, p. 4B.

Myers, Jim. "Rx: More Money, Status and Control." USA Today. August 11, 1987, pp. 1 & 2.

National Alliance of Business. "The Disappearing Quality of of the U.S. Workforce: What Can We Do to Save It?" Supplement to Time. 1989, 6 pages.

National Center for Education Statistics. The Condition of Education: A Statistical Report, 1985. Washington, DC: U.S. Department of Education. 1985.

National Center for Education Statistics. The Traditionally Black Institutitions of Higher Education: Their Development and Status, 1860-1982. Washington, DC: U.S. Department of Education. 1985.

"Needed Human Capital." Business Week. September 19, 1988, p. 103.

Nelson, Lee. "Rocky Will Get Child Center." Quad City Times. September 13, 1989, p. 25.

"The New Europe? Yes. Fortress Europe? No." Business Week, December 12, 1988, p. 136.

Novak, Michael. "Attacking Problems Money Can't Solve." New York Times. March 22, 1987, p. F2.

Occupational Outlook Handbook. 1988-89 Edition. U.S. Department of Labor, Bureau of Labor Statistics.

"Ozone Defense." Time. May 15, 1989, p. 63.

Pallas, Aaron M., Gary Natkiello, and Edward L. McDill. "The Changing Nature of the Disadvantaged Population: Current Dimensions and Future Trends." Educational Researcher, June/July 1989, pp. 16-22.

Parnell, Dale. The Neglected Majority. Washington, DC: The Community College Press, A Division of the American Association of Community and Junior Colleges. 1985, 184 pages.

Patten, Larry G. Iowa Educational Telecommunicatins Plan. Presented to the Education Uplink Committee of the 72nd General Assembly of the State of Iowa. August 1987, 167 pages.

Personick, Valerie. "Projections 2000: Industry Output & Employment," Monthly Labor Review, September 1987, p. 36.

Pins, Kenneth. "For First Time in 8 Years, Iowa Shows Rise in Births." The Des Moines Register. June 22, 1989, pages 1A & 3A)

Ramacitti, David and Associates. "We Are Your Answer: A Strategic Marketing Plan for the Eastern Iowa Business and Industry Center." Davenport, Iowa. 1988, 46 pages.

Redman, Christopher. "Charging Ahead." Time September 18, 1989, pp. 40-45.

Rednour, Jill, Phil Hart, and Mike Botlo. Overall Economic Development Program for the Bi-State Region. Bi-State Metropolitan Planning Commission. June, 1989.

"Report Claims United States Faces Major Workforce Crisis." Quad City Times. September 2, 1989, p. 5.

"Reshaping Europe: 1992 and Beyond." Business Week. December 12, 1988, pp. 48-51.

Rhey, John. "SDI's Technology Dividends." Defense World. June-July 1989, p. 10-11.

Rhodes, Frank H. T. "A Neglected Challenge: Minority Participation in Higher Education." Speech delivered in May 1987, at the Annual Meeting of the Board of Directors of the Academy for Educational Development. Published by the Academy for Educational Development.

Richman, Louis S. "Tomorrow's Jobs: Plentiful, but . . ." Fortune. April 11, 1988, pp. 42-56.

Roe, Patricia. Leading Edge Technologies. Austin, TX: The (IC)2 Institute, the Universi y of Texas at Austin. Fall 1988, 46 pages.

Roe, Patricia. Leading Edge Technologies. Austin, TX: The (IC)2 Institute, the University of Texas at Austin. Spring 1989, 35 pages.

Roe, Patricia. Leading Edge Technologies. Austin, TX: The (IC)2 Institute, the University of Texas at Austin. Winter 1989, 36 pages.

Sagan, Carl. "Why We Need to Understand Science." Parade Magazine. September 10, 1989, pp. 6-10.

Schellhardt, Timothy D. and Carol Hymowitz. "U.S. Revival Depends on Break From Old Ways." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A22.

"Schools Aren't Tuned in to Teens' Needs, Study Says." Quad City Times. June 19, 1989, p. 1.

"Second Life Styrofoam." Time. May 22, 1989, p. 84.

"A Select Few Poised to Lead Business into the '90s: Both Old-Line and Upstart Firms, Many of Them Excel as Innovators," The Wall Street Journal, Centennial Edition, June 23, 1989, p. A3.

Silvestri, George T., and John M. Lukasiewicz. "Projections 2000: A Look at Occupational Employment Trends to the Year 2000." Monthly Labor Review. September 1987, pp. 46-63.

Stone, Nan. "The Globalization of Europe: An Interview With Wisse Dekker." Harvard Business Review. May-June, 1989, p. 92. (pp. 90-95)

Sullivan, Scott. "Who's Afraid of 1992?" Newsweek. October 31, 1988, pp. 32-34.

"Thailand, Malaysia Set for Economic Takeoff." The Wall Street Journal, Centennial Edition. June 23, 1989, p. A8.

Tifft, Susan. "A Crisis Looms in Science." Time. September 11, 1989, pp. 68-70.

Toufexis, Anastasia. "Our Violent Kids." Time. June 12, 1989, pp. 52-58.

"Trying to Decipher Babel." Time. July 24, 1989, p. 62.

"Two Out of Five Firstborn Children Conceived Out of Wedlock." The Des Moines Register. June 22, 1989, p. 6A.

U.S. Census Bureau. School Enrollment - Social and Economic Characteristics of Students. August 13, 1985.

"Unhealthy Shortage of Nurses Put Grads on Call." The Des Moines Sunday Register. April 12, 1987. pp. 1 & 4.

"The Urgent Need to Recycle: Once is Not Enough." Time, special advertising section. Published by the Council for Solid Waste Solutions, pp.1-12.

Voss, Melinda, "Workplace Basics," The Des Moines Register, April 23, 1989, pp. 1E-2E.

Westphal, David. "Iowa Plight: Birthrate Losing to Death Toll; Exodus Grows." The Des Moines Register. March 6, 1988, pp. 1 & 4.

"Why the Underclass Can't Get Out From Under." Business Week. September 19, 1988, pp. 122-124.

"Will the New Europe Cut U.S. Giants Down to Size?" Business Week. December 12, 1988, pp. 54-58.

Wilson, R., and S. E. Melendez. 4th Annual Status Report on Minorities in Higher Education. Washington, DC: American Council on Education. 1985.

"Work in the Twenty-first Century." Futures. December, 1986, pp. 827-28.

Wysocki, Bernard, and Michael J. McCarthy. "Latest New Frontier: Ex-Urban Boom Towns." The Wall Street Journal, Centennial Edition. June 23, 1989, pp. A7 & A14.

"Your Baby or Your Job." The Economist. January 24, 1987, p. 26.

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